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BUTCH TONGATE
Cabinet Secretary

J. C. BORREGO
Deputy Secretary

Certified Mail – Return Receipt Requested

May 1, 2017

Mr. Paul Bessey, President
Desert Mountain Transportation, Inc.
dba Desert Mountain Corporation
P.O. Box 1633
Kirtland, NM 87417

**Re: Desert Mountain Transportation, Inc. dba Desert Mountain Corporation; Kirtland, New Mexico;
Unpermitted MSGP; SIC 4213/NAICS 484121; Compliance Evaluation Inspection; NPDES
Tracking No. NMU001932; April 6, 2017**

Dear Mr. Bessey:

Enclosed please find a copy of the report for the referenced inspection that the New Mexico Environment Department (NMED) conducted at your facility on behalf of the U.S. Environmental Protection Agency (USEPA). This inspection report will be sent to the USEPA in Dallas for their review. These inspections are used by USEPA to determine compliance with the National Pollutant Discharge Elimination System (NPDES) permitting program in accordance with requirements of the federal Clean Water Act.

You are encouraged to review the inspection report, required to correct any problems noted during the inspection, and advised to modify your operational and/or administrative procedures, as appropriate. If you have comments on or concerns with the basis for the findings in the NMED inspection report, please contact us (see the address below) in writing within 30 days from the date of this letter. Further, you are encouraged to notify in writing both the USEPA and NMED regarding modifications and compliance schedules at the addresses below:

David Long, NPDES Enforcement Coordinator
Environmental Protection Agency, Region 6
NPDES Enforcement Branch (6EN-WM)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Sarah Holcomb, Program Manager
New Mexico Environment Department
Surface Water Quality Bureau (N2050)
Point Source Regulation Section
P.O. Box 5469
Santa Fe, New Mexico 87502

If you have any questions about this inspection report, please contact Erin S. Trujillo at 505-827-0418 or erin.trujillo@state.nm.us.

Sincerely,

/s/Sarah Holcomb

Sarah Holcomb
Program Manager
Point Source Regulation Section
Surface Water Quality Bureau

Mr. Bessey, Desert Mountain, NMU001932

May 1, 2017

Page 2 of 2

cc: Carol Peters-Wagnon, USEPA (6EN-WM) by e-mail
David Long, USEPA (6EN-WM) by e-mail
David Esparza, USEPA (6EN-WM) by e-mail
Amy Andrews, USEPA (6EN-WM) by e-mail
Robert Houston, USEPA (6EN)
Darlene Whittten-Hill, USEPA (6EN) by e-mail
Robert Italiano, NMED District II by e-mail
Ali Furmall and Justin Ball, NMED Ground Water Quality Bureau (GWQB) by e-mail



Form Approved
OMB No. 2040-0003
Approval Expires 7-31-85

NPDES Compliance Inspection Report

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5 3 N M U 0 0 1 9 3 2 11 12 1 7 0 4 0 6 17 18 C 19 S 20 2					
Remarks					
T R A N S P O R T A T I O N & W A R E H O U S I N G					
Inspection Work Days	Facility Evaluation Rating	BI	QA	Reserved	
67 69	70 1	71 N	72 N	73 74 75	80

Section B: Facility Data

Name and Location of Facility Inspected (For industrial users discharging to POTW, also include POTW name and NPDES permit number)	Entry Time /Date ~1315 hours / 04/06/2017	Permit Effective Date June 4, 2015
Desert Mountain Transportation, Inc. dba Desert Mountain Corporation, 4381 U.S. Hwy 64 (P.O. Box 1633), Kirtland, NM 87417. San Juan County.	Exit Time/Date ~ 1545 hours / 04/06/2017	Permit Expiration Date June 4, 2020
Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s) Travis Orand, Operations Manager, Desert Mountain Corporation, 505-598-5730 Ginger Lockerby, Safety Director/DOT, Desert Mountain Corporation, 505-598-5730	Other Facility Data <u>Entrance</u> Latitude: 36.733904° Longitude: - 108.327512°	
Name, Address of Responsible Official/Title/Phone and Fax Number Mr. Paul Massey, President / Desert Mountain Transportation, Inc. dba Desert Mountain Corporation, PO Box 1633, Kirtland, NM 87417 / 505-598-5730, 1-800-375-9264	Contacted Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Primary SIC 4213 (Trucking) Sector P (Transportation & Warehousing) Sub-Sector P1

Section C: Areas Evaluated During Inspection

(S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated)

U Permit	N Flow Measurement	M Operations & Maintenance	N CSO/SSO
N Records/Reports	N Self-Monitoring Program	N Sludge Handling/Disposal	N Pollution Prevention
U Facility Site Review	N Compliance Schedules	N Pretreatment	N Multimedia
N Effluent/Receiving Waters	N Laboratory	U Storm Water	N Other:

Section D: Summary of Findings/Comments (Attach additional sheets if necessary)

- See attached report and further explanations.

Name(s) and Signature(s) of Inspector(s) Erin S. Trujillo /s/Erin S. Trujillo	Agency/Office/Telephone/Fax NMED/SWQB/505-827-0418	Date 05/01/2017
Signature of Management QA Reviewer Sarah Holcomb, Program Manager /s/Sarah Holcomb	Agency/Office/Phone and Fax Numbers NMED/SWQB/505-827-2798	Date 05/01/2017

Desert Mountain Transportation, Inc. dba Desert Mountain Corporation
Compliance Evaluation Inspection
NPDES Tracking No. NMU001932
April 6, 2017

Further Explanations

Introduction

On April 6, 2017, a Compliance Evaluation Inspection (CEI) was conducted by Erin S. Trujillo of the State of New Mexico Environment Department (NMED), Surface Water Quality Bureau (SWQB) at the Desert Mountain Corporation facility located at 4381 U.S. Hwy 64 (southwest corner of US Hwy 64 and County Road (CR) 6261), Kirtland, New Mexico in San Juan County.

NMED performs a certain number of CEIs for the United States Environmental Protection Agency (USEPA) each year. On April 4, 2017, NMED SWQB staff received information from an anonymous caller that a spill of liquid dust suppressant had occurred at the facility in March 2017 and stormwater runoff from the spill and facility was dark brown. The purpose of this inspection was to document the operator's status or compliance with the National Pollutant Discharge Elimination System (NPDES) permit requirements for stormwater discharges associated with industrial activity under 40 Code of Federal Regulations (CFR) 122.26 and USEPA industrial stormwater Multi-Sector General Permit (MSGP). More information on federal NPDES regulations and MSGP is provided in Appendix A. Examples of potential pollutants associated with motor transportation facilities are listed in Appendix B.

This report is based on review of USEPA's on-line notice of intent (eNOI) database, files maintained by NMED, on-site observation by NMED personnel, and both verbal and subsequent information provided by the operator's representatives. Additional information was obtained from on-line sources including the facility's web site at <http://desertmtncorp.com/>.

Upon arrival at approximately 1315 hours on the day of the inspection, Ms. Trujillo made introductions, presented credentials to Mr. Travis Orand, Operations Manager and Ms. Ginger Lockeby, Safety Director/DOT Compliance, Desert Mountain Corporation and discussed the purpose of the inspection. The inspector, Mr. Orand and Ms. Lockeby toured the facility, including the area where the spill occurred and adjacent CR 6100 right of way south of the facility. Following the tour, an exit interview was conducted on site with Mr. Orand and Ms. Lockeby. Information on the USEPA MSGP was provided to the operator representatives during the exit interview. The inspector left the facility at approximately 1545 hours on the day of this inspection.

The facility is approximately 0.65 miles north of the San Juan River (See Appendix C, Figures 1, 2, 3 and 4). Stormwater discharges from the facility are to the south-southwest toward open ditches along adjacent CR 6100, of which overflows may enter private irrigation laterals, thence to unnamed and unclassified drainageway to surface water and wetlands approximately 0.4 miles south of the facility, thence to the San Juan River in Segment 20.6.4.401 New Mexico Administrative Code (NMAC). Some waters in this segment are under the joint jurisdiction of the state and the Navajo Nation. Designated uses of this segment of San Juan River are public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life. San Juan River assessment unit NM-2401_10 does not support marginal coldwater aquatic life and primary contact. The assessment unit is listed for sedimentation/siltation, turbidity and E.coli bacteria (Source: USEPA approved 2016-2018 State of New Mexico Clean Water Act (CWA) §303(d)/§305(b), Integrated Report and List at <https://www.env.nm.gov/swqb/303d-305b/2016-2018/index.html>).

On-Site Industrial Activity, Pollutant Sources and Pollutants

Desert Mountain Transportation, Inc. dba Desert Mountain Corporation is an active Riverton, Wyoming foreign profit corporation with a date of authority in the State of New Mexico of May 16, 1995 (New Mexico Secretary of the State on-line corporation search available at the following web site: http://www.sos.state.nm.us/Business_Services/Corporations_Overview.aspx).

Mr. Orand described that Desert Mountain Corporation, primarily a transportation company, had operated at the Kirtland, New Mexico site since 1998. Desert Mountain Corporation provides dust control, ice melting, road stabilization and soil stabilization products and services for various clients and applications (e.g., roadway, mining, landfills, etc.). Ice melting products stored on site include salt with chlorides and trace minerals including calcium, iron, magnesium, manganese, phosphorous, potassium and zinc (<http://desertmtncorp.com/ice-slicer/>). Dust control proprietary blends, including ammonium-based and sodium-based lignin/lignosulfonate as the primary additive, are stored in various above-ground storage tanks and totes. Lignin is an organic polymer substance that binds the cells and fibers of wood. Water evaporates from lignin as it dries after application.

The facility has a vehicle maintenance shop (mechanical repairs and lubrication) and equipment cleaning operations (see 40 CFR 122.26(b)(14) category viii, Standard Industrial Classification (SIC) group 42 Trucking & Warehousing, SIC 4212-4231 Motor Freight Transportation and Warehousing, and MSGP Sector P Land Transportation and Warehousing). Mr. Orand described that fueling is longer conducted on site. Co-located industrial activities at the facility include manufacturing, in this case blending of dust control and ice melting materials (see 40 CFR 122.26(b)(14) category ii and Sector C Chemical and Allied Products Manufacturing).

Common activities, pollutant sources and pollutants for vehicle maintenance and outdoor vehicle and equipment storage and parking include, but are not limited to, oil, detergents, heavy metals, chlorinated solvents, phosphorus, salts (total dissolved solids), and suspended solids. Pollutants from liquid storage in above-ground storage tank include oil, grease, heavy metals, and the materials being stored.

Readily available on-line historic images of the facility are provided in Appendix C Figures 5 and 6. Dark brown features visible in 2011 and 2015 images of the site are similar to the dark brown lignin polymer solids and liquids on the ground surface observed during this CEI. Photos of example activities and potential pollutant sources observed during this CEI are provided in Appendix D. Additional information on the March 9-10, 2017, described approximately 18,000-gallon sodium salt lignin alkali spill, from local on-line newspaper, material information provided during this CEI, and follow up information provided to NMED SWQB on April 25 and 26, 2017 in Appendix E. Desert Mountain Corporation representatives described recovery of approximately 9,000 gallons of the spill, corrective action after the spill and proposed BMPs. for the site.

Findings

- Desert Mountain Transportation, Inc. dba Desert Mountain Corporation, primarily a transportation establishment with co-located chemical manufacturing (blending) activities described to be in operation since 1998, did not obtain permit coverage for stormwater discharges by the deadlines in USEPA's NPDES Industrial Stormwater 2000, 2008 or 2015 MSGP.

Additional Information: A Notice of Intent (NOI) for the facility was not found in USEPA's Enforcement and Compliance History On-line (ECHO) database at <https://echo.epa.gov> or 2008 on-line query at https://ofmpub.epa.gov/apex/aps/f?p=MSGP_2008:HOME:::. Operator representatives indicated that they were not aware of the industrial stormwater permit.

- The site had vehicle maintenance and equipment cleaning, and processing and raw materials storage industrial activities, including outside storage and stockpiling of materials and material handling that would come into contact with stormwater.

Potential pollutant sources exposed to precipitation included:

- shop floor drains used for wash wastewater that are connected (plumbed) to outside excavated pits (see Part 8.P.4.2 Potential Pollutant Sources and Part 5.2.3 of the 2015 MSGP);
- salt storage piles or piles containing salt (see Part 2.1.2.7 of the 2015 MSGP); and
- equipment cleaning, product tank cleaning or draining operations to outside pits and/or on the ground surface (see Parts 8.P.2.1 Prohibited Discharges, Parts 1.1.4 and 8.P.3.1.4 of the 2015 MSGP).

Additional Note: USEPA's MSGP does not authorize the discharge of vehicle/equipment/surface wash water, including tank cleaning operations. Such discharges must be authorized under a separate NPDES permit, discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements, or recycled on-site.

- On the day of this CEI, dark brown polymer lignin solids and liquids were observed both on-site and on the adjacent county road right of way and roadside ditches. The dark brown liquid appeared to be from the March 9-10, 2017 sodium salt lignin alkali spill, but may also have been from stormwater runoff after the spill occurred from remaining lignin solids from the spill both within and outside the site, storage of polymer lignin product on site, or co-mingled with liquids from tank cleaning or draining operations on site.

Additional Precipitation Information: After the spill, recorded precipitation in the area (approximately 5.25 miles west of the facility at the Farmington Four Corners Regional Airport (Elev 5505 feet, Latitude 36.74 °N, Longitude 108.23 °W, <https://www.wunderground.com>) include:

03/23/17	0.08 inches Rain
03/25/17	0.12 inches Rain, Thunderstorm
03/31/17	0.12 inches Rain, Snow
04/01/17	0.04 inches Fog, Rain, Snow
04/03/17	0.47 inches Fog, Rain, Snow
04/04/17	0.20 inches Fog, Rain, Snow

Attachment A

Federal Clean Water Act (CWA) and Industrial Stormwater Permit Requirements

Section 301 (a) of the Federal Water Pollution Control Act states that *“Except as in compliance with this section and sections 302, 306, 307, 318, 402 and 404 of this Act, the discharge of any pollutant by any person shall be unlawful.”* Federal regulations in 40 CFR Part 122.21(a) Duty to apply (1) states: *“Any person who discharges or proposes to discharge pollutants...must submit a complete application to the Director in accordance with this section and part 124 of this chapter.”*

Eleven (11) categories of “Storm Water Discharges Associated with Industrial Activity” are defined in 40 CFR 122.26(b)(14)(i)-(xi) that require coverage under an National Pollutant Discharge Elimination System (NPDES) permit. Industrial stormwater has been regulated since the promulgation of United States Environmental Protection Agency (USEPA) 1990 stormwater regulations. The definition uses either Standard Industrial Classification (SIC) codes or narrative descriptions to characterize the activities. SIC codes have been replaced by the North American Industry Classification System (NAICS), but continue to be utilized. On-line information on SIC and NAICS is available at:

<https://www.osha.gov/pls/imis/sicsearch.html>
<http://www.census.gov/eos/www/naics/index.html>

In the State of New Mexico, USEPA administers the NPDES Multi-Sector General Permit (MSGP) for stormwater discharges associated with industrial activity and the first permit was published on September 29, 1995 (Federal Register Volume 60, No. 189 on Friday 29, 1995, page 50953). USEPA’s 1995 MSGP listed pollutants associated with the various regulated sectors. USEPA’s MSGP was reissued in 2000, 2008 and 2015.

To obtain permit coverage under the MSGP, an operator must complete, or update, a Stormwater Pollution Prevention Plan (SWPPP) that documents eligibility for permit coverage, and submit a notice of intent (NOI) to the USEPA. Among other things, requirements in the MSGP include site-specific best management practices (BMPs), maintenance plans, inspections, employee training and annual reporting. BMPs include good housekeeping practices, minimizing exposure, erosion and sediment control, and management of runoff. The MSGP also requires visual, and, for some sectors, analytical monitoring to determine the effectiveness of implemented BMPs.

USEPA has developed a fact sheet for each of the 29 industrial sectors regulated by the MSGP. Each fact sheet describes the types of facilities included in the sector, typical pollutants associated with the sector, and types of stormwater control measures used to minimize the discharge of the pollutants. Individual fact sheets area available at:

<https://www.epa.gov/npdes/industrial-stormwater-fact-sheet-series>.

The current MSGP went into effect on June 4, 2015 and expires on June 4, 2020. More information on USEPA MSGP, including SWPPP and inspection form templates, is available at:

<https://www.epa.gov/npdes/stormwater-discharges-industrial-activities>.

A sign up to receive the Federal Register Table of Content Notices announcing the availability of the next MSGP Permit is available at <http://www.gpo.gov/fdsys/browse/collection.action?collectionCode=FR>.

Attachment B

MSGP Sector P – Transportation Facilities Common Activities, Pollutant Sources and Associated Pollutants

INDUSTRIAL STORMWATER FACT SHEET SERIES		
Sector P: Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, Rail Transportation Facilities, and United States Postal Service Transportation Facilities		
Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Rail Transportation Facilities, and United States Postal Service Transportation Facilities (continued)		
Activity	Pollutant Source	Pollutant
Vehicle washing and maintenance	Parts cleaning	Chlorinated solvents, oil, heavy metals, acid/alkaline wastes
	Waste disposal of greasy rags, oil filters, air filters, batteries, hydraulic fluids, transmission fluid, radiator fluids, degreasers	Oil, heavy metals, chlorinated solvents, acid/alkaline wastes, ethylene glycol
	Spills of oil, degreasers, hydraulic fluids, transmission fluid, radiator fluids	Oil, arsenic, heavy metals, organics, chlorinated solvents, ethylene glycol
	Fluids replacement, including oil, hydraulic fluids, transmission fluid, radiator fluids	Oil, arsenic, heavy metals, organics, chlorinated solvents, ethylene glycol
	Washing or steam cleaning	Oil, detergents, heavy metals, chlorinated solvents, phosphorus, salts, suspended solids
Outdoor vehicle and equipment storage and parking	Leaking vehicle fluids including hydraulic lines and radiators, leaking or improperly maintained locomotive on-board drip collection systems, brake dust	Oil, hydraulic fluids, arsenic, heavy metals, organics, fuel
Painting areas	Paint and paint thinner spills	Paint, spent chlorinated solvents, heavy metals
	Spray painting	Paint solids, heavy metals
	Sanding or paint stripping	Dust, paint solids, heavy metals
	Paint clean up	Paint, spent chlorinated solvents, heavy metals
Railroad locomotive sanding	Loading traction sand on locomotives	Sediment
Liquid storage in above ground storage	External corrosion and structural failure	Oil, grease, heavy metals, materials being stored
	Installation problems	
	Spills and overfills due to operator error	
	Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)	

Source: Industrial Stormwater Fact Sheet Series, Sector P: Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, Rail Transportation Facilities, and United States Postal Service Transportation Facilities, U.S. EPA Office of Water, EPA-833-F-06-031, December 2006 available at https://www.epa.gov/sites/production/files/2015-10/documents/sector_p_transportationfacilities.pdf.

Appendix C

Figures

Figure 1 - General Site Location
NMED SWQB Mapper at <https://gis.web.env.nm.gov/SWQB/>

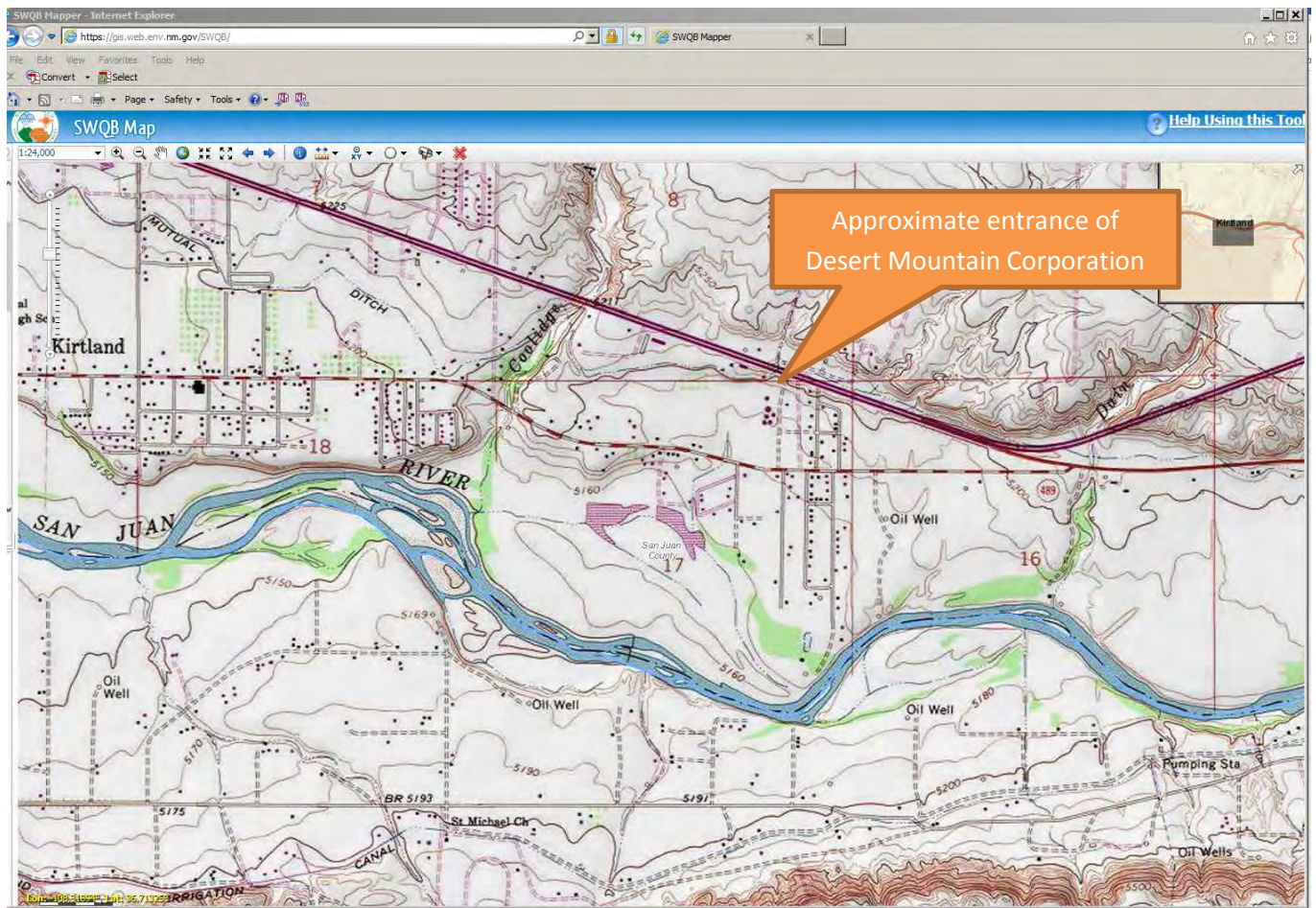


Figure 2 – Facility Parcel Map (County of San Juan, Assessor Property Search
<http://www.sjassessor.net/Disclaimer.html>)



Figure 3 – Site and Adjacent Area (Google Earth Imagery Date 03/15/2015)



Figure 4 - National Wetlands Inventory Map
<https://www.fws.gov/wetlands/data/Mapper.html>

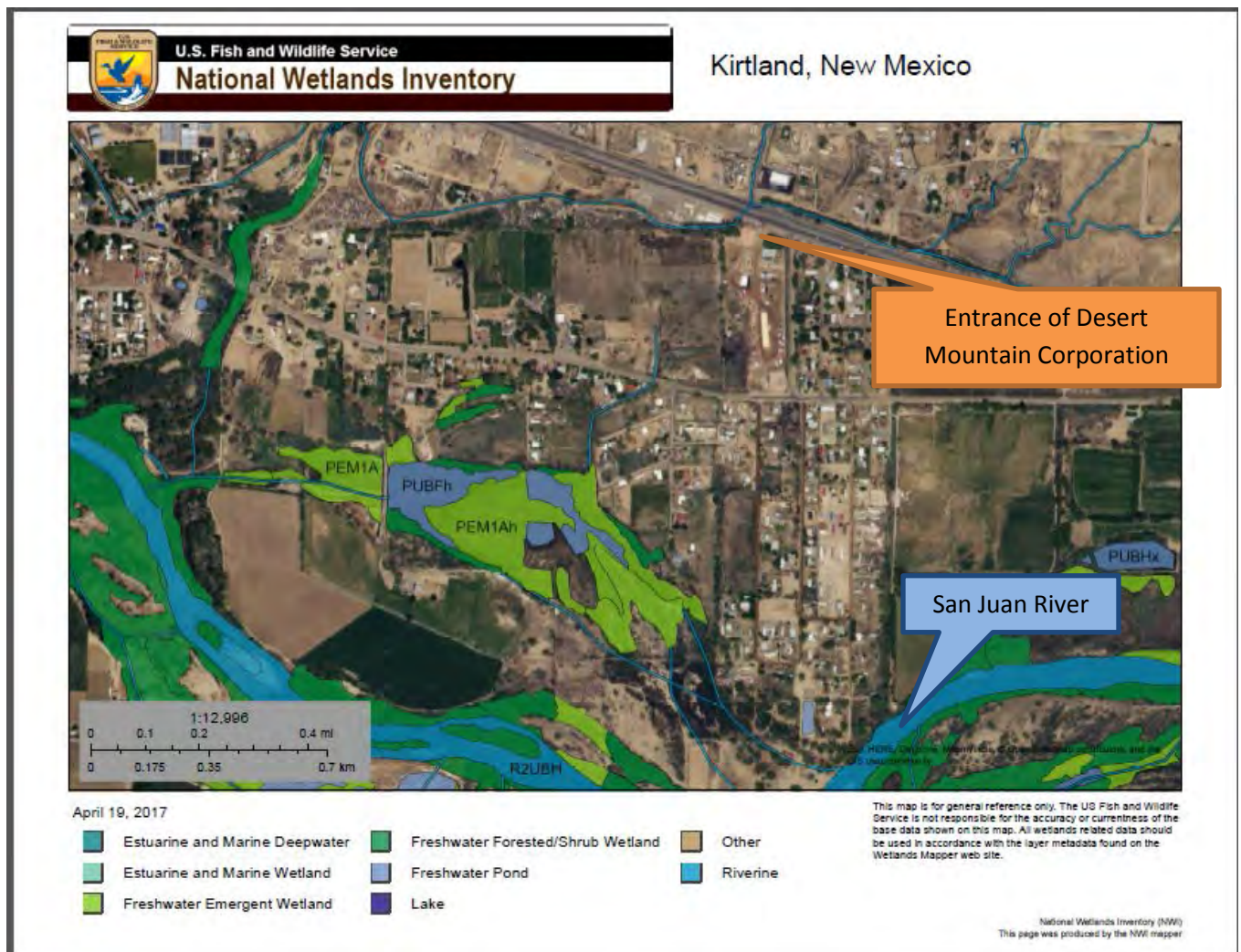
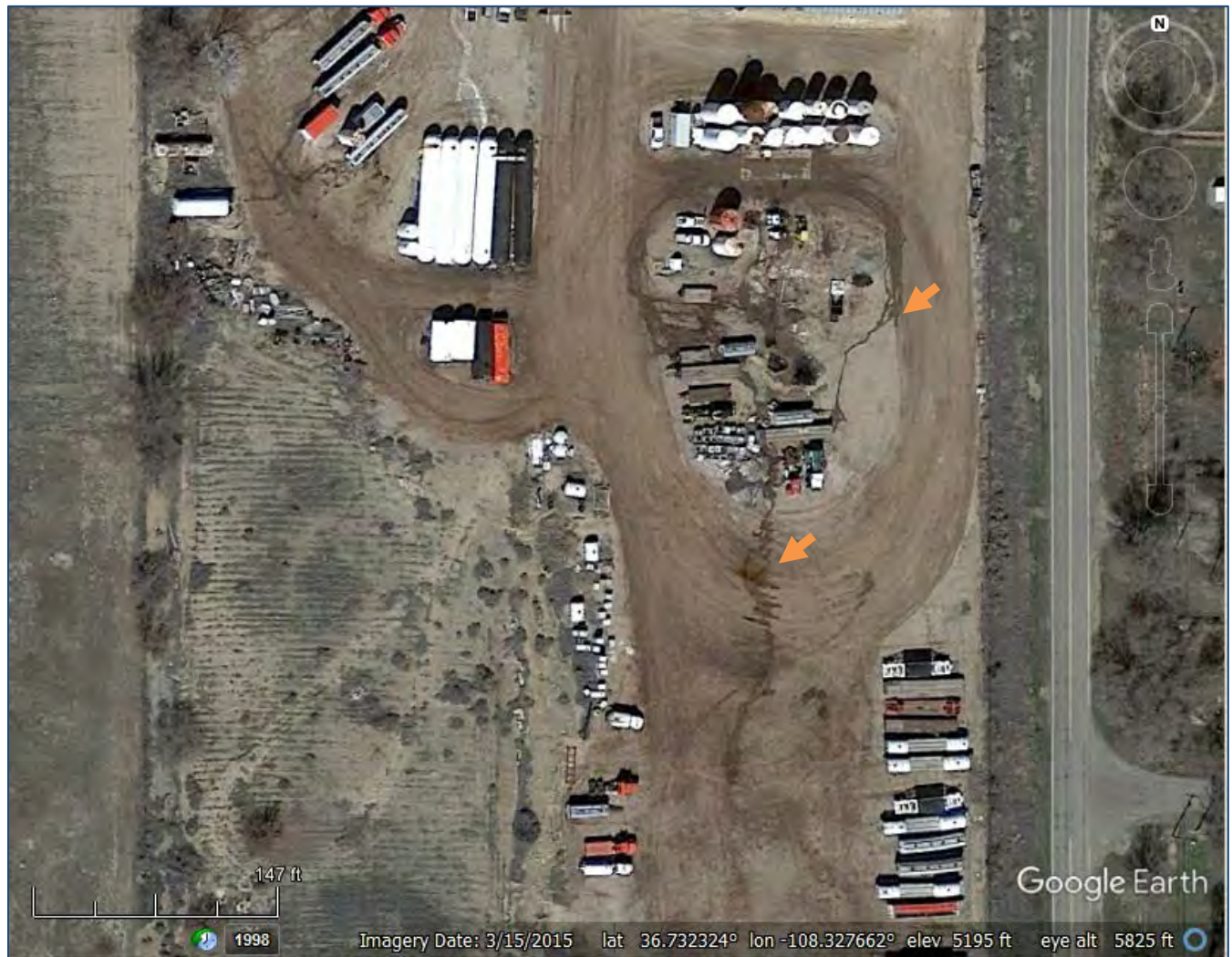
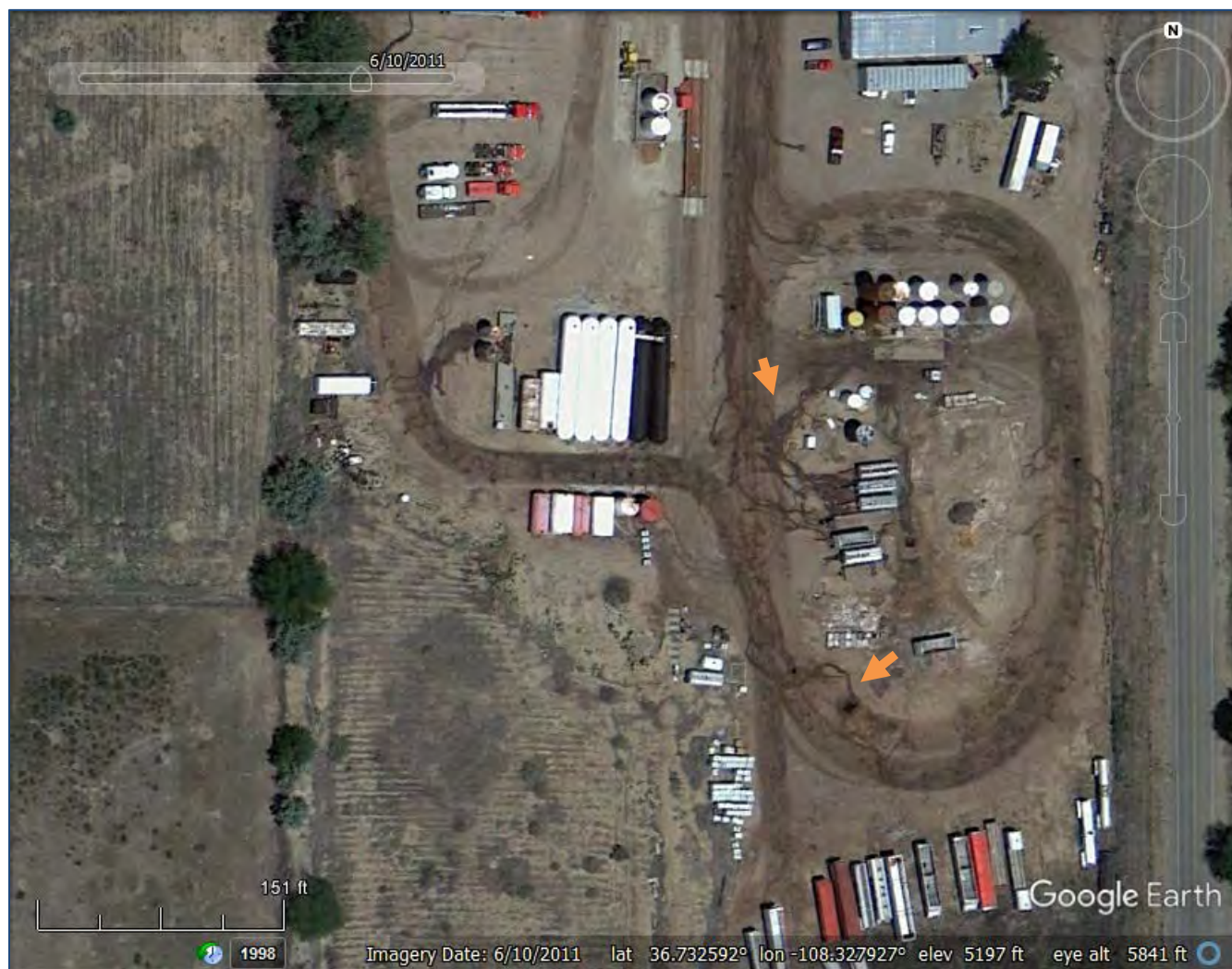


Figure 5 – Facility Image (Google Earth Imagery Date 03/15/2015)



Note: Arrows points to example of dark brown features visible in 2015 image similar to dark brown lignin polymer solids and liquids observed during this CEI.

Figure 6 – Facility Image (Google Earth Imagery Date 06/10/2011)



Note: Arrows points to example of dark brown features visible in 2011 image similar to dark brown lignin polymer solids and liquids observed during this CEI.

Attachment D

NMED/SWQB Photograph Log

NMED/SWQB		
Official Photograph Log		
Photo # 1		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1337 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From central portion of site looking west, the black above-ground storage tanks contained mixed salt liquid lignin dust suppressant according to operator representatives. Dark brown liquid was pooled below tanks. A valve leak and spill occurred from the second black tank on March 9-10, 2017 according to operator representatives.		



NMED/SWQB		
Official Photograph Log		
Photo # 2		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1342 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Arrows point to dark brown liquid pooled below tanks shown in previous photo, and dark brown polymer product and liquids outside berm.		



NMED/SWQB Official Photograph Log Photo # 3		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1344 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From central portion of site looking south, examples of facility metal, pallets, drums, totes and equipment storage.		



NMED/SWQB Official Photograph Log Photo # 4		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1345 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From central portion of site looking north, arrow in foreground of photo points to example of white residue in shallow drainage rill on site. Callout shows location of facility entrance and salt storage near facility entrance.		



NMED/SWQB		
Official Photograph Log		
Photo # 5		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1353 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From southern boundary of site looking west, dark brown solids and liquids were observed along facility's fence. Arrow points to pooled liquid inside fence.		



NMED/SWQB Official Photograph Log Photo # 6		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1357 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Looking west, dark brown solids and liquid existed on CR 6100 right of way. Arrow points dark brown liquid inside facility's fence shown in previous photo. Landscape rock outside fence was installed after the spill according to operator representatives.		



NMED/SWQB		
Official Photograph Log		
Photo # 7		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1359 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Looking east, dark brown solids and liquid that appear to be from spill remain on CR 6100 right of way.		



NMED/SWQB		
Official Photograph Log		
Photo # 8		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1400 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: West of facility, dark brown liquid was in north drainage ditch on CR 6100 right of way. Arrow points to culvert that crosses beneath CR 6100. Culvert appears to connect both ditches along CR 6100.		



NMED/SWQB		
Official Photograph Log		
Photo # 9		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1406 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: West of facility from CR 6100 right of way, looking south, the blue utility delineator shown in this photo is near the location of a partially buried end of culvert that was shown in previous photo.		



NMED/SWQB		
Official Photograph Log		
Photo # 10		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1407 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Arrow points to partially buried end of culvert on southside of CR 6100. Although not discernable in photo, brown liquid was observed at the culvert end.		



NMED/SWQB		
Official Photograph Log		
Photo # 11		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1407 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: West of facility looking south, dark brown liquid was observed in south drainage ditch on CR 6100 right of way west of previous photo.		



NMED/SWQB		
Official Photograph Log		
Photo # 12		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1414 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Inside facility, looking north, white residue and dark solids existed on the ground surface in southern portion of site.		



NMED/SWQB Official Photograph Log Photo # 13		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1415 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: North of previous photo, looking northeast, piled salt was from product tank cleaning according to operator representative. White residue from the piled salt continues south along shallow rill. Dark brown solids and liquid in foreground of photo may be from spill or stormwater runoff.		



NMED/SWQB		
Official Photograph Log		
Photo # 14		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1416 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Looking north, arrow points to shallow earthen and aggregate berm placed after the spill according to the operator representatives. The berm did not continue across entire site boundary.		



NMED/SWQB		
Official Photograph Log		
Photo # 15		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1424 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From central portion of site looking west, arrow points to example of brown liquid south of the product loading area.		



<p align="center">NMED/SWQB Official Photograph Log Photo # 16</p>		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1425 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Looking north, liquids in lined pit were described by operator representative to be reused or recycled in blended products. Arrow points to dark brown liquid outside and adjacent to lined pit.		



NMED/SWQB Official Photograph Log Photo # 17		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1427 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Wet soils and dark brown liquid in equipment traffic area existed south and west of the product loading area.		



NMED/SWQB		
Official Photograph Log		
Photo # 18		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1428 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Example of tote and fac tank product storage. Wet soils and dark brown liquid in traffic area existed south of the product loading area.		



NMED/SWQB		
Official Photograph Log		
Photo # 19		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1429 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: In central portion of site, asphalt material was on ground below a broken bag stored on wooden pallet.		



NMED/SWQB Official Photograph Log Photo # 20		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1433 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Product loading area in central portion of site. Wet soils, dark brown lignin polymer and dark brown liquid existed in loading area.		



NMED/SWQB		
Official Photograph Log		
Photo # 21		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1434 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Example of equipment and dark liquid near product loading tanks.		



<p align="center">NMED/SWQB Official Photograph Log Photo # 22</p>		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1435 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
<p>Subject: Looking south in central portion of site from product loading area, excavated pit is in foreground and lined pit previously shown in early photo is in background. Vehicle maintenance shop floor drains are connected to the excavated pit (photos below) and equipment, product tank cleaning or draining flows to the unlined pit then lined pit shown in background according to operator representatives. Operator representative did not know last time solids in pits were removed.</p>		



NMED/SWQB Official Photograph Log Photo # 23		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1437 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From central portion of site, blue-green staining on buckets and ground at product loading area.		



NMED/SWQB		
Official Photograph Log		
Photo # 24		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1443 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: From northeast corner of site, vehicle maintenance, tires and product storage in totes exist near northern property boundary.		



NMED/SWQB		
Official Photograph Log		
Photo # 25		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1446 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Vehicle maintenance shop floors were relatively clean, except for a couple areas. This example of oily dark staining was below the parts cleaner and associated equipment.		



<p align="center">NMED/SWQB Official Photograph Log Photo # 26</p>		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1446 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: One of two floor drains in vehicle maintenance shop. According to operator representatives, drains had removable lids and maintenance shop bay floor wash wastewater is sent down the drains that are connected (plumbed) to the outside excavated pit shown in Photo #22.		



NMED/SWQB		
Official Photograph Log		
Photo # 27		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1447 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: One of two floor drains in vehicle maintenance shop. According to operator representatives, drains had removable lids and maintenance shop bay floor wash wastewater is sent down the drains that are connected (plumbed) to the outside excavated pit shown in Photo #22.		



NMED/SWQB		
Official Photograph Log		
Photo # 28		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1448 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Vehicle maintenance product storage and tanker inside vehicle maintenance shop bay.		



NMED/SWQB		
Official Photograph Log		
Photo # 29		
Photographer: Erin S. Trujillo	Date: 04/06/2017	Time: 1455 hours
City/County: Kirtland, New Mexico / San Juan County		State: New Mexico
Location: Desert Mountain Corporation		
Subject: Looking northwest, salt pile storage was located at northern property boundary near entrance.		



Attachment E

March 9-10, 2017 Desert Mountain Corporation, Sodium Salt Lignin, Alkali Spill Information

Spill cleanup nears completion in Kirtland

By Mike Easterling / The Daily Times, Farmington, N.M. (TNS)

Sunday, March 12th, 2017 at 10:18am

KIRTLAND — A spill of a liquid dust suppressant Friday on County Road 6100 just south of Kirtland largely had been cleaned up by Saturday afternoon, and none of the oily material reached a nearby irrigation ditch, according to a fire official.

San Juan County Fire Department District No. 1 Chief Donovan Mack said the spill was reported at approximately 10:30 a.m. Friday at a storage site near the northwest corner of county roads 6100 and 6261 north of the San Juan River. Mack said the black liquid was derived from tree sap and has been designated as nonhazardous.

A sign on the property indicated it was operated by XTO Energy. A message left at the company's San Juan County headquarters was not returned Saturday.

State officials also responded to the scene and oversaw the company's cleanup efforts. The leak apparently originated near the south end of the property, close to CR 6100.

Mack estimated that approximately 300 gallons of the material had flowed onto the easement adjacent to the road, although he did not know how much had leaked onto the company's land. Mack said he was told the spill was the result of a leaking valve.

He acknowledged that the material looks like oil and said he understood that passersby may have mistaken it for that. But he said the dust suppressant is made of organic material.

"There's no petroleum in it," he said.

He also said that cleanup crews stopped the flow of the material before it reached the irrigation ditch.

"It never reached that point," he said, adding that workers used a backhoe to stem the flow. "It was probably 50 or 60 feet from the irrigation ditch."

Most of the material was removed with a pump, he said, and the company will be removing the contaminated soil.

Mike Easterling covers education, health and the environment for The Daily Times. He can be reached at 505-564-4610.

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Spill Cleanup Nears Completion In Kirtland

© Sun, 03/12/2017 - 17:53 by The Daily Times  1 comments  19 share  report



 Share Source: daily-times.com

A San Juan County fire official said the material is nonhazardous and contains no petroleum.

From: [Ginger Lockeby](#)
To: [Trujillo, Erin S. NMENV](#)
Subject: Desert Mountain
Date: Monday, April 24, 2017 6:32:49 PM
Attachments: [image001.png](#)
[image002.png](#)
[image004.png](#)
[image005.png](#)
[Sodium Lig spill - yard 2017.xlsx](#)

Erin,

I tried the link you sent, our security is blocking it.

I hope these come through...there's not too many.

You have the photos from after our initial clean-up, so I did not send those.

Thank you,

Ginger Lockeby

Safety Director/Human Resources/FMCSA-DOT Compliance

Desert Mountain Corporation

4381 US HWY 64 - Kirtland NM 87417

1-800-375-9264 - Office

(505)320-6250 - Mobile

www.desertmtncorp.com



Follow Desert Mountain Corporation on....



Virus-free. www.avast.com

From: [Ginger Lockeby](#)
To: [Trujillo, Erin S. NMENV](#)
Subject: Desert Mountain
Date: Tuesday, April 25, 2017 8:24:23 AM
Attachments: [image001.png](#)
[image002.png](#)
[image004.png](#)
[image005.png](#)
[Sodium Lignin Spill and Response.docx](#)

Erin,

I believe I sent you an incomplete powerpoint on spill expenses, instead of this one.

Ginger Lockeby

Safety Director/Human Resources/FMCSA-DOT Compliance

Desert Mountain Corporation

4381 US HWY 64 - Kirtland NM 87417

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Sodium Lignin Spill and Response

On the night of March 9-10, 2017, Justin Patterson (company driver) was in the yard with his truck and discovered a spill on the ground that appeared to have some from the sodium lig tank. He called dispatcher Troy West; who came down to the yard to verify and see what could be done. At this point, no more liquid was being released from the tank. Justin had already closed and capped all other tanks, to be sure that nothing else would leak.

On the morning of March 10, in the daylight, we could better see the amount that had drained from the tank, and also ascertain that there had be a failure of one of the valves of the tank itself. The cap had not been replaced, which might have contained the liquid if it had been in place.

Initial clean-up began at sun-up, also. Using our vacuum truck, all puddle areas were recovered and put into 275 gallon totes to be re-used. During this time, emergency responders were dispatched out, presumably by concerned neighbors. Sodium lignin has a dark molasses-like color, and does resemble used oil.

A dirt berm was made outside of our back fence, to keep and lig from entering a drainage ditch located just southwest of our property line. Since the lig is of such a color as to track it's progress, we were able to determine where the flow had stopped, and begin the recovery of material from there and work back into our yard. (Once the clean-up was completed, the berm was smoothed back out.)

A One Call was made, so that the grader/blade that Tom rented could be utilized to scrape up the discolored areas of our yard, and 275.62 tons of road base was brought in to smooth out the area. Also, colored, decorative rock was placed outside our south fence, to help improve the look of the discolored ground.

After going through bills of lading, it was determined that 18,000 gallons of sodium lig was present in the tank at the time of the spill. During the initial cleanup, 9,000 gallons were recovered, and will be put back into use.

Upon going through the causal factors (cap not on, secondary valve left open, the one valve that was closed failed) new work procedures were developed for closing and capping the valves coming off of the tanks. Also, there are new work procedures for anyone connecting to, or filling the tanks. Two people, usually the driver and a yard worker, need to be present to verify steps have been taken to open/close/disconnect, and verify the tanks are double-valve closed, and capped after using.

It has been decided by the owners, that there will be two capture ponds dug and lined, between our holding tanks and our south property line, in the event that we have any spills in the future. We now also have added a 2 ½' to 3' dirt berm containing any runoff from our property until the ponds are completed. There is now a pit dug under the tank valves, which was not there prior to the spill.





















SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION

Product Name & synonyms: Road Loc (tc)
Chemical Name: Sodium Salt Lignin, Alkali
Manufactured for: Desert Mountain Corporation
CAS #: PJ Box 1533
Supplier's Name/Address: Kirtland, N.M. 87417
Tel: (505) 598-5730

Recommended Use: None
Restrictions on Use: None

SECTION 2 - HAZARDOUS IDENTIFICATION

Main Hazard: None
Flammability: non-flammable
Chemical Hazard: None

Component	% (Wt or Vol)	ACGIH TWA Units	ACGIH STEL Units	OSHA PEL Units
None	---	---	---	---

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Product Description: Sodium Lignin

SECTION 4 - FIRST AID MEASURE

Effects from Routine Use: None known
Effects of overexposure: None known
Probable Routes of Exposure: Skin, eyes
Emergency & First Aid Procedures:

Eye Contact: Rinse immediately with water. Remove contact lenses; flush eyes with water. Consult a physician if necessary.
Skin Contact: Wash skin with soap and water.
Inhalation: Not applicable.

Swallow: Rinse mouth immediately - dilute by drinking large quantities of water. Avoid dilution, induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE AND EXPLOSION DATA

Flash Point:	Not applicable	
Fire Extinguishing Media:	Water and CO2	
Flammable Limits (% by Vol)	Not Applicable	
Special Firefighting Procedures & Equipment:		Normal
Unusual Fire/Explosion Hazards:		None

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

Steps to be taken in Case Material is Released or Spilled:

Liquids: Dam area to prevent spill from spreading this minimizes adverse effects on the environment. Recover as much as possible of pure product in appropriate containers. Later, determine if this recovered product can be used for its intended purpose.

Wash area with water. Spills or releases of this material do not currently trigger the emergency release reporting requirements under the Federal Superfund Amendments and Re-authorization Act of 1986 (SARA). State and local laws may differ from federal law.

Waste Disposal Methods: Customary plant procedures for industrial waste treatment.

Environmental Precaution:

Do not discharge concentrated, undiluted product into streams, ponds, estuaries, oceans and other waters.

Resource Conservation & Recovery Action (RCRA) Requirements: None known

Consult counsel for further guidance on local laws.

SECTION 7 - HANDLING AND STORAGE

Personal Protective Equipment:

Protective Gloves: Rubber gloves recommended

Eye Protection: Goggles recommended

Respiratory Protection (Specify Type):

Air -purifying respirator recommended for prolonged exposure to high concentrations.

Other Protective Equipment: As appropriate to prevent bodily contact

Ventilation: Recommended

Local Exhaust: Recommended

Mechanical (General) Recommended

Special: None

Other: None

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protection - respiratory: Respiratory protection recommended.

Personal Protection - hand: Product is not a skin irritant.
Robber gloves are recommended.

Personal Protection - eye: Safety glasses are required.

Personal Protection - skin: Product is not a skin irritant.

Other Protection: Eye wash fountain in the work place
is strongly recommended.
Ensure adequate ventilation.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Viscous liquid.

Appearance & Odor: Dark Brown liquid with wood odor

Boiling Point (oF): 100 C

Molecular Weight: Unknown

Freezing Point (oF): -8 C

Vapor Pressure (mm Hg) Aqueous solution, like that of water

PH: Approx. 7.0 - 9.0

Solubility in Water: Completely Soluble

SECTION 10 - REACTIVITY DATA

Stability: Unstable Stable X

Conditions to Avoid: None known

Incompatibility (Materials to Avoid):
Caution needed with strong oxidizing agents

SECTION 11 - TOXICITY DATA

Local Effects: None

Skin irritant: None - this product is not classified
as a skin irritant.

Eye Irritant: None - this product is not classified
as a skin irritant.

Ecological Information: None

Disposal Considerations: Dispose with accordance to local/national
regulations governing the disposal of
waste material.

Transport Information: None known

Regulatory Information: none-regulated

Summary: Not Toxic or harmful

OTHER INFORMATION

NON HAZARDOUS NON TOXIC

Other Precautions: None known
Registrations/Certifications: None
Effective Date: January 6, 2015
Supersedes: All previous editions

IMPORTANT:

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no inability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Desert Mountain Corp. be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Desert Mountain Corp. has been advised of the possibility of such damages.



SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION

Product Name & synonyms: Polybond
Chemical Name: Sodium Salt Lignin, Alkali
Chemical Family: Norampac - Trenton, ON Division
Manufacturer: 8068-05-1
CAS #: Truth Chemical
Supplier's Name/Address: 2170 Buckthorne Pl, Suite
400
The Woodlands, TX 77380
Tel: (281) 292-6900
Recommended Use: None
Restrictions on Use: none

SECTION 2 - HAZARDOUS IDENTIFICATION

Main Hazard: None
Flammability: Non-flammable
Chemical Hazard: None

Component:	% (Wt or Vol)	ACGIH TWA Units	ACGIH STEL Units	OSHA PEL Units
None	--	---	---	---

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Product Description: Sodium Lignin

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Effects of overexposure: None known
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Emergency & First Aid Procedures:

Eye Contact: Rinse immediately with water. Remove contact lenses; flush eyes with water. Consult a physician if necessary.
Skin Contact: Wash skin with soap and water.
Inhalation: Not applicable
Ingestion: Rinse mouth immediately - dilute by drinking large quantities of water. After dilution, induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious person.

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Flash Point:	Not applicable	
Fire Extinguishing Media:	Water and CO2	
Flammable Limits (% by Vol)	Not Applicable	
Special Firefighting Procedures & Equipment:		Normal
Unusual Fire/Explosion Hazards:		None

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Steps to be taken in Case Material is Released or Spilled:

Liquids: Dam area to prevent spill from spreading this minimizes adverse effects on the environment Recover as much as possible of pure product in appropriate containers. Later, determine if this recovered product can be used for its intended purpose.

Wash area with water. Spills or releases of this material do not currently trigger the emergency release reporting requirements under the Federal Superfund Amendments and Re-authorization Act of 1986 (SARA). State and local laws may differ from federal law.

Waste Disposal Methods: Customary plant procedures for industrial waste treatment.

Environmental Precaution:

Do not discharge concentrated, undiluted product into streams, ponds, estuaries, oceans and other waters.

Resource Conservation & Recovery Action (RCRA) Requirements:

None known

Consult counsel for further guidance on local laws.

SECTION 7 - HANDLING AND STORAGE

Personal Protective Equipment:

Protective Gloves: Rubber gloves recommended

Eye Protection: Goggles recommended

Respiratory Protection (Specify Type):

Air -purifying respirator recommended for prolonged exposure to high concentrations.

Other Protective Equipment: As appropriate to prevent bodily contact

Ventilation: Recommended

Local Exhaust: Recommended

Mechanical (General) Recommended

Special: None

Other: None

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protection - respiratory: Respiratory protection recommended.

Personal Protection - hand: Product is not a skin irritant.
Robber gloves are recommended.

Personal Protection - eye: Safety glasses are required.

Personal Protection - skin: Product is not a skin irritant.

Other Protection: Eye wash fountain in the work place
is strongly recommended.
Ensure adequate ventilation.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Viscous liquid.

Appearance & Odor: Dark Brown liquid with wood odor

Boiling Point (oF): 100 C

Molecular Weight: Unknown

Freezing Point (oF): -8 C

Vapor Pressure (mm Hg) Aqueous solution, like that of water

PH: Approx. 7.0 - 9.0

Solubility in Water: Completely Soluble

SECTION 10 - REACTIVITY DATA

Stability: Unstable Stable X

Conditions to Avoid: None known

Incompatibility (Materials to Avoid):
Caution needed with strong oxidizing agents

SECTION 11 - TOXICITY DATA

Local Effects: None

Skin irritant: None - this product is not classified
as a skin irritant.

Eye Irritant: None - this product is not classified
as a skin irritant.

Ecological Information: None

Disposal Considerations: Dispose with accordance to local/national
regulations governing the disposal of
waste material.

Transport Information: None known

Regulatory Information: none-regulated

Summary: Not Toxic or harmful

OTHER INFORMATION

NON HAZARDOUS NON TOXIC

Other Precautions: None known
Registrations/Certifications: None
Effective Date: January 6, 2015
Supersedes: All previous editions

IMPORTANT:

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LIGNIN/LIGNOSULFONATE

February 2012



Presented by Lou Snow

LIGNIN/LIGNOSULFONATE

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February 2012

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Reference Materials:

- Dust Control/Soil Stabilization Flow Chart
- Comparative Table: Various Dust Control Products
- Soil Stabilization Questionnaire – Road Surfaces
- Required Equipment, Mixing and Applications Instructions
- Specific Gravity Chart
- Viscosity Chart
- Temperature and Total Solids Relationship Chart
- Soil Identification Procedure Chart
- Soil Compaction Characteristics and Ratings (Unified Soil Characteristics)
- Engineering Use Chart for Unified Soil Characteristics
- Answers to Questions about Lignosulfonates (FAQ)
- Lignins – A Safe History of Usage
- Reports on Lignin Safety (3)
- Product Information Sheets
 - Borregaard Norlig A (Calcium Lignosulfonate)
 - Georgia-Pacific LIGNOSITE (Calcium Lignosulfonate)
 - Georgia-Pacific DUSTAC Road Binder (Calcium Lignosulfonate)
- Glossary

LIGNIN/LIGNOSULFONATE

Lignin is “Mother Nature’s Super Glue.” It is naturally tacky when moistened, with curing equal to concrete, but it can be rejuvenated with water when longer cures are needed.

Lignosulfonate

Lignosulfonate, or sulfonated lignin, is a naturally occurring polymer found in wood that acts like glue holding the cellulose fibers of pulp together. During the pulping process, lignin is separated from the wood and undergoes an extensive process, eventually becoming an effective ammonium-based or sodium-based lignosulfonate.

When used for dust control, lignosulfonate binds surface particles together. Water evaporates from the lignin as it dries after application. Dust control is achieved as the high-viscosity, naturally sticky material traps dust particles. Over time, the sun's heat makes the lignin completely insoluble, creating a tough, water-resistant and durable dust-controlled surface.

Road Usage

- Lignin is used on a worldwide basis for road stabilization, with enough produced to circle the equator three times with a road 24 feet wide.
- Lignin creates a bonded road surface and subsurface, increasing the soil's compressive strength many times, equaling that of concrete or asphalt. It reduces pot holes and wash boarding.
- Lignin can be rejuvenated with water when needed to blade out any road surface deficiencies during maintenance.
- Lignin works as an excellent sub-base stabilizer for high volume paved roads, saving money in export/import materials for roadbeds.
- Lignins typically have a neutral pH with a corrosion rate less than that of water, enabling preservation of roadside vegetation and even acting as a fertilizer when diluted.
- Lignin is considered the most environmentally friendly of all dust control products, other than water, and can be applied around environmentally sensitive areas.

Lignin application and mixing can be accomplished by using existing road equipment.

Typical Dilution and Application Rates

Depending on a variety of variables (soil characteristics, ambient temperatures, type and frequency of traffic) the typical dilution ratio of Lignin to water is equal (50/50). The diluted application rates will vary from 0.10 to 1.0 diluted gallons per square yard.

Lignin Storage

Lignin can be stored in virtually any air-tight storage container or facility. Avoid freezing. Periodic agitation is recommended prior to application.

Raw Materials

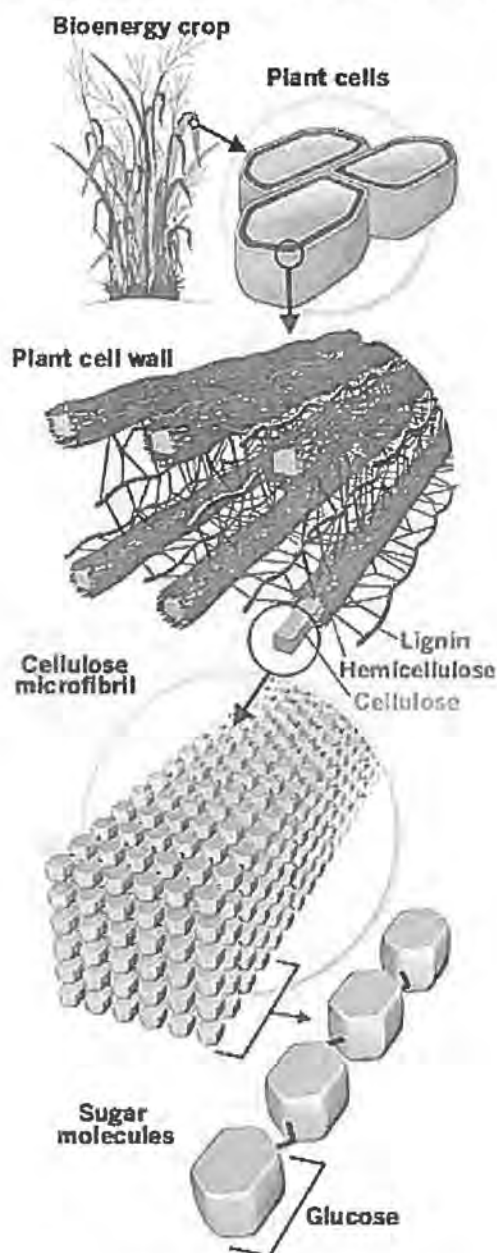


Various types of wood are selected to maximize wood utilization from the forest. Generally, hardwoods like aspen, maple and birch are separated from the softwoods such as spruce, jack pine, hemlock, red pine and white pine. Hardwood and softwood products have differences in their chemical and physical properties based on the structure of the lignin in the different wood species.

Pulping Process

Wood is then cooked with the chemicals of ammonia and sulfur dioxide in an acid solution with water. Wood is cooked into pulp through a lengthy process.

Cooking acid is continuously circulated through heat exchangers and the wood pulp as the temperature is raised to 150 degrees Celsius (approximately 302 degrees Fahrenheit) over 3-4 hours. Sulfur dioxide is recovered to maintain proper cooking pressure as the cooking continues for 6-8 more hours. At the end of cooking, the mixture of pulp and spent sulfite liquor is sent to the recovery system. The pulp fiber is separated from the mixture by pressing and washing stages. During pulping, the lignin in the wood is sulfonated and hydrolized. The lignin becomes soluble and remains in the spent sulfite liquor.



*Hemi-cellulose and lignin form a protective sheath around carbon molecules of sugars in the form of cellulose. These materials are not fermentable without pre-treatment.
(Genome Management Information System/ORNL.)*

Liquor Recovery and Alcohol Fermentation

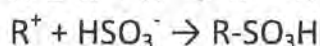
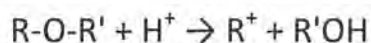
Spent sulfite liquor is evaporated to 20% solids by removing water and sulfur dioxide, and then it is neutralized to pH 5.5 with ammonia. Yeast is added to the liquor, and fermentation occurs. Carbon sugars are fermented to ethanol and CO_2 . Alcohol is stripped from the liquor by distillations, and the stripped liquor is further evaporated until solids are at 50%.

Lignin Products

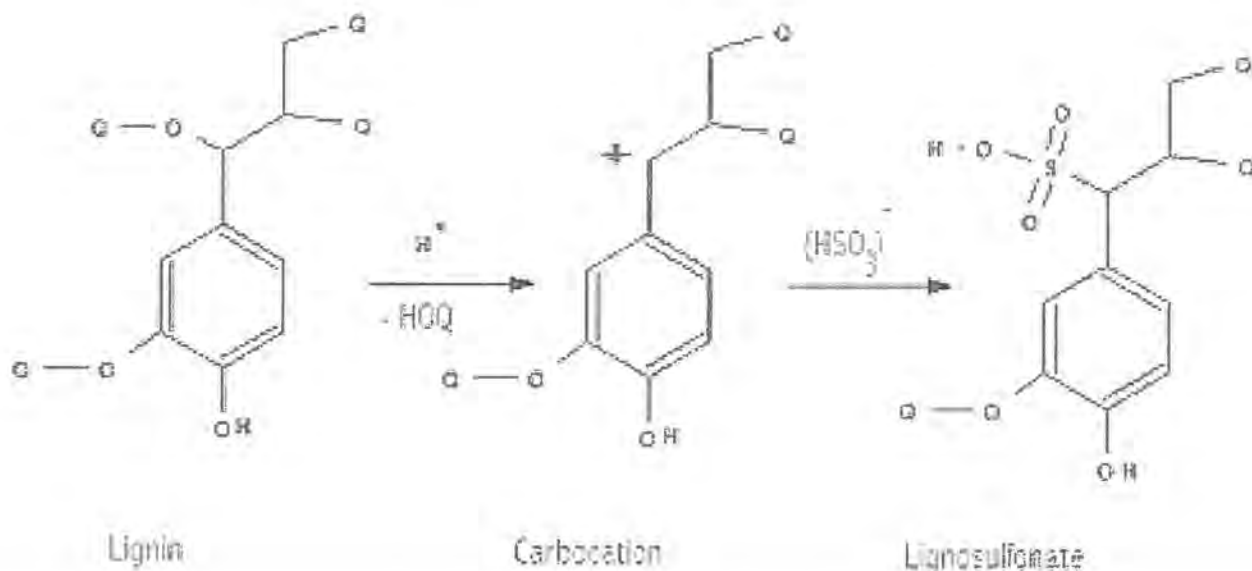
The 50% liquor ("heavy liquor") is the basis for liginosulfonate operations. Sodium products are made by adding caustic soda to the liquor.

Chemical Composition

The chemical reaction from combining positively charged carbon atoms (carbocation) produced during processing, with bisulfite ions (HSO_3^-) results in sulfonates.



The following structures do not specify the structure since lignin and its derivatives are complex mixtures; the purpose is to give a general idea of the structure of liginosulfonates. The groups labeled "Q" can be a wide variety of groups found in the structure of lignin.



Lignin Uses

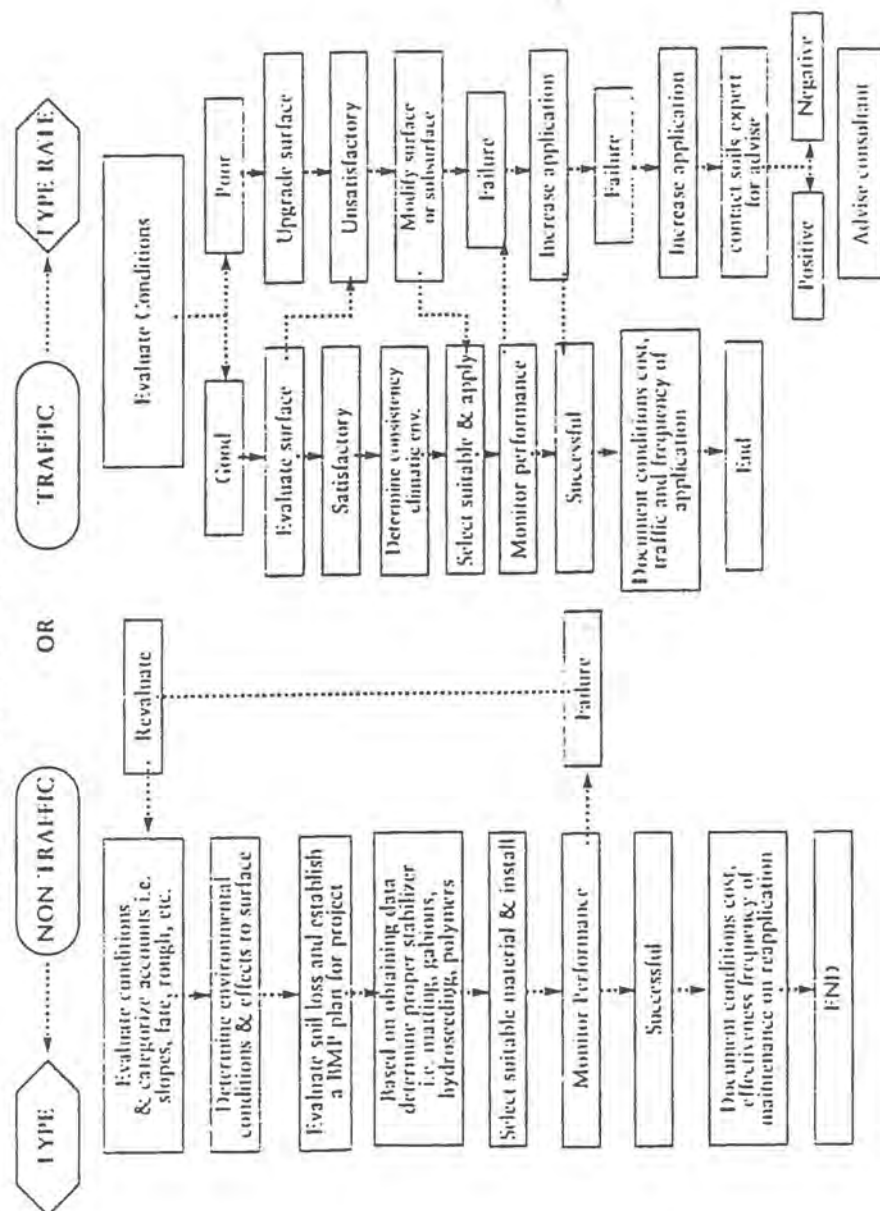
The first known use of lignosulfonates was in 1908, and today there are many and varied applications.

- The single largest use for lignosulfonates is as plasticizers in making concrete, where they allow concrete to be made with less water (giving stronger concrete) while maintaining the ability of the concrete to flow.
- Lignosulfonates are also used during the production of cement, where they act as grinding aids in the cement mill and as a raw mix slurry deflocculant (that reduces the viscosity of the slurry).
- Lignosulfonates are used for the production of plasterboard to reduce the amount of water required to make the stucco flow and form the layer between two sheets of paper. The reduction in water content allows lower kiln temperatures to dry the plasterboard, saving energy.
- The ability of lignosulfonates to reduce the viscosity of mineral slurries is used to advantage in oil drilling mud, where it replaced tannic acids from quebracho (a tropical tree).
- Lignosulfonates are used to disperse pesticides, dyes, carbon black, and other insoluble solids and liquids into water.
- They are used in tanning leather.
- They are used to suppress dust on unpaved roads.
- Oxidation of lignosulfonates from softwood trees produces vanillin (artificial vanilla flavor).
- Dimethyl sulfide and dimethyl sulfoxide (DMSO, an important organic solvent) are produced from lignosulfonates.



DUST CONTROL/SOIL STABILIZATION FLOW CHART

IDENTIFY AREA TO BE STABILIZED



COMPARATIVE TABLE FOR VARIOUS DUST CONTROL PRODUCTS

Typical "Generic Surface/Subbase Stabilizers	Water	Chlorides	Lignins	Emulsions	Acrylics Polymers	Enzymes	Acids	Resins	Petroleum Based	Formulated Products
Typical Dilution Water/Product	0	0	1:1	4:1	20:1	20:1	40:1	4:1	0	
Application rate (Gal/Square Yards)	5-20	.25-.75	.25-1.0	.1-1.0	01-1.0	.01-1		.1-1.0	.1-1.0	
Method of Application Surface	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	
Subbase Stabilization	No	No	Yes	No	No	Yes	Yes	Yes	No	
Estimated Life Based on dilution/ application rate in months	0	1-6 mo.	3-12mo.	1-6 mo.	1-3mo.	1-3mo.	1-3mo.	1-6 mo.	1-3mo.	
Soil Penetration base stabilization	Low	Medium	Medium	Low	Low	Low	Medium	Medium	Low	
Environmentally friendly	Yes	Corrosive	Yes	Yes	Yes	Yes	Corrosive	Yes	No	
Frequency of application	High	Medium	Low	Medium	Medium	High	Medium	Low	High	
Soil penetration	0	Low	Medium	Low	Low	Medium	Medium	Medium	Medium	
Preparation cost	0	Low	Medium	Low	Low	Medium	Medium	Medium	Medium	
Traffic	Low	Medium	High	Medium	Low	Low	Medium	Medium	Low	
Non-Traffic	Low	Low	Medium	Medium	Medium	Medium	Low	Medium	Low	
Premoistening required?	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	
Ideal type soil	0	Various	Various	Various	Various	Various	Clay	Various	Various	
Initial Cost	Low	Low	Medium	Low	Low	Medium	Low	Medium	High	
Long term cost	High	Medium	Low	Medium	Low	Medium	Medium	Medium	High	
Reduced Maintenance cost										
Watering	0	High	Low	Low	Medium	High	High	Low	Low	
Maintenance	Low	Medium	Low	Medium	Medium	High	Medium	Low	Low	
Soil replacement	High	Medium	Low	High	Low	Medium	Low	Low	High	

FOOTNOTES: ON ANY PRODUCT TRY TO OBTAIN AT LEAST THE FOLLOWING:
PERFORMANCE HISTORY, MSDS, PRODUCT INFORMATION, TOXICITY, BOD, LD-50.

Dust Control



...solutions for stabilizing your environment

SOIL STABILIZATION QUESTIONNAIRE - ROAD SURFACES

DATE: _____ BY: _____

CONTACT: _____ PHONE: _____

CUSTOMER: _____ FAX: _____

ADDRESS: _____ E-MAIL: _____

SITE LOCATION: _____

SITE TYPE: _____

DIMENSIONS: _____ LENGTH X _____ WIDTH X _____ DEPTH

TYPE OF TRAFFIC: _____ DAILY COUNT: _____

MARGIN PERCENT GRADES: _____ = _____ % OF TOTAL SURFACE

SOIL TYPES: (based on Sieve Analysis) EXISTING SOILS IN PLACE

WEARING SURFACE: _____

SUB-SURFACE TO DEPTH OF STABILIZATION: _____

BASE COARSE (below stabilized soil): _____

AVAILABLE SOIL (provide sieve analysis of each)

EXISTING TEST RESULTS (provide test results and ASTM test methods)

IF EXISTING ROAD, FREQUENCY OF MAINTENANCE: _____ TYPE: _____

IF NEW ROAD, LIFE EXPECTANCY: _____

AVAILABLE EQUIPMENT FOR IMPROVING SURFACE (state model and manufacturer of each): _____

CUSTOMER COMMENTS: _____

PLEASE RETURN VIA FAX TO DUST PRO, INC. (602) 251-3659
725 S. 12TH PLACE - PHOENIX, AZ 85034 / POST OFFICE BOX 24509 - PHOENIX, AZ 85074-4509



(602) 251-3878 - Fax (602) 251-3659 - E-mail lsnow@worldnet.att.net - Website <http://www.dustpro.com>

DUSTPRO

2432 W. Peoria Avenue • Suite 1160 • Phoenix, AZ 85029
Post Office Box 82247 • Phoenix, AZ 85071-2247
(602) 944-8411 • FAX (602) 944-9103

EQUIPMENT NEEDED

Motor grader (preferably 2) - One grader should be equipped with scarifiers teeth.

Water truck - Two if they are small capacity or if water source is not nearby.

Rubber tired roller

Steel drum roller (optional)

BLADE MIXING AND APPLICATION OF LIGNOSITE*

- ~Build Road
- ~Scarify to depth of 3 inches
- ~Apply water to dampen all loose material
- ~Windrow loose material to one side
- ~Water road base
- ~Pull about one-half of windrow across road
- ~Apply .2 gallon per square yard of LIGNOSITE* onto loose material
- ~Pull remainder of windrow across road
- ~Apply another .2 gallon per square yard of LIGNOSITE* onto loose material
- ~Blade mix and windrow material into center of road
- ~Water road on both sides of windrow (if necessary)
- ~Flatten windrow to a 12' width
- ~Apply .1 gallon per square yard of LIGNOSITE* to flattened windrow
- ~Blade-mix
- ~Lay material out
- ~Crown and finish road
- ~Roll
- ~Water lightly
- ~Topshoot with .2 gallon per square yard of LIGNOSITE* diluted 1 to 1 with water
- ~Water lightly for next 2 to 3 days

*LIGNOSITE is a Registered Trademark of Georgia-Pacific Corporation



DUSTPRO

2432 W. Peoria Avenue • Suite 1160 • Phoenix, AZ 85029
Post Office Box 82247 • Phoenix, AZ 85071-2247
(602) 944-8411 • FAX (602) 944-9103

BLADE MIX AND APPLICATION OF LIGNOSITE* ROAD BINDER

PRIOR TO DATE OF APPLICATION

Prepare the road by removing any large rock, cleaning ditches and insuring adequate drainage along shoulders. If road surface is extremely hard, it should be loosened by scarifying to a depth of 3 inches. Water, so that the road is damp to a depth of 3 inches.

DAY OF APPLICATION

Scarify to depth of 3 inches and windrow material to one side. Apply water to loose material during this process to dampen it throughout. Water road surface and pull about one-half of windrow across the road.

Apply LIGNOSITE* across entire width of road at a rate of 0.2 gallons per square yard. Pull the remainder of windrowed material across the road and apply another applications of LIGNOSITE* at 0.2 gallons per square yard.

Blade-mix this loose material by angling the blade slightly backwards thus scooping the material and having it roll off the end of the blade. This is much more effective than merely plowing it. The material should then be windrowed into the center of the road. Flatten this windrow out to a width of about 12 feet. The applicator truck should then apply .1 gallon of LIGNOSITE* to this flattened windrow.

Blade-mix and lay this material out across the road. Finish blade making sure to allow a 1-1/2% crown. Roll with rubber tired roller. If a steel wheeled roller is available it can be used when material is dry enough that it does not pick up on the roller drum.

When rolling is complete apply light coat of water and top-shoot with .2 gallon per square yard of LIGNOSITE* diluted with water at a rate of 1 to 1.

Typically one mile of road per day can be treated assuming work prior to application has been completed and all equipment listed below is available.

It is recommended that you water the treated road once per day for the next two to three days. Do not water heavily enough to allow rutting or runoff.



*LIGNOSITE is a registered trademark of Georgia-Pacific Corporation

SPECIFIC GRAVITY OF LIGNOSITE® SOLUTIONS

1.28

1.24

1.20

1.16

1.12

1.08

1.04

1.00

SPECIFIC GRAVITY (30°/4°)

PERCENT SOLIDS BY WEIGHT

0

10

20

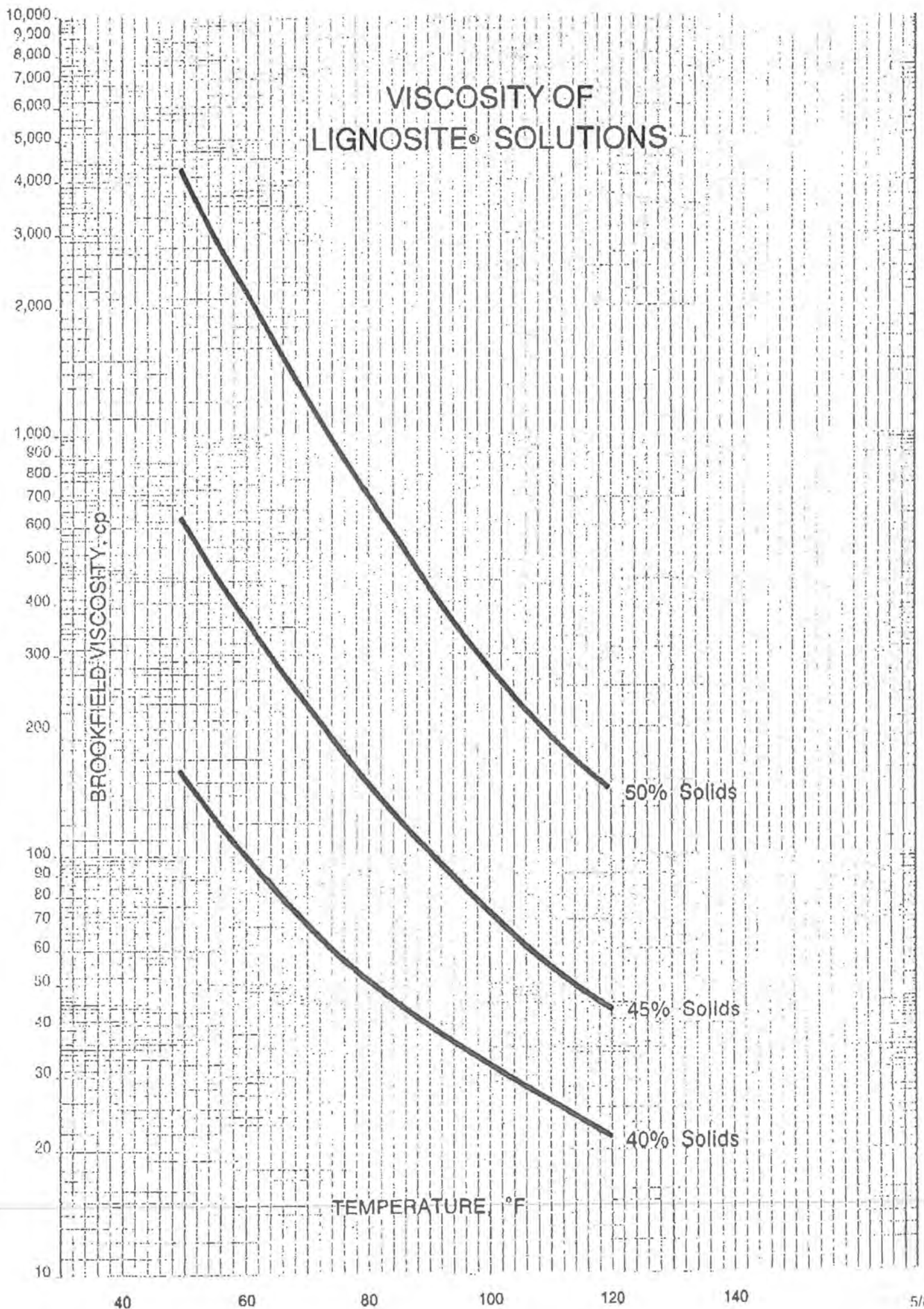
30

40

50



VISCOSITY OF LIGNOSITE® SOLUTIONS



Relationship of Specific Gravity of LIGNOSITE® Liquor with Temperature and Total Solids

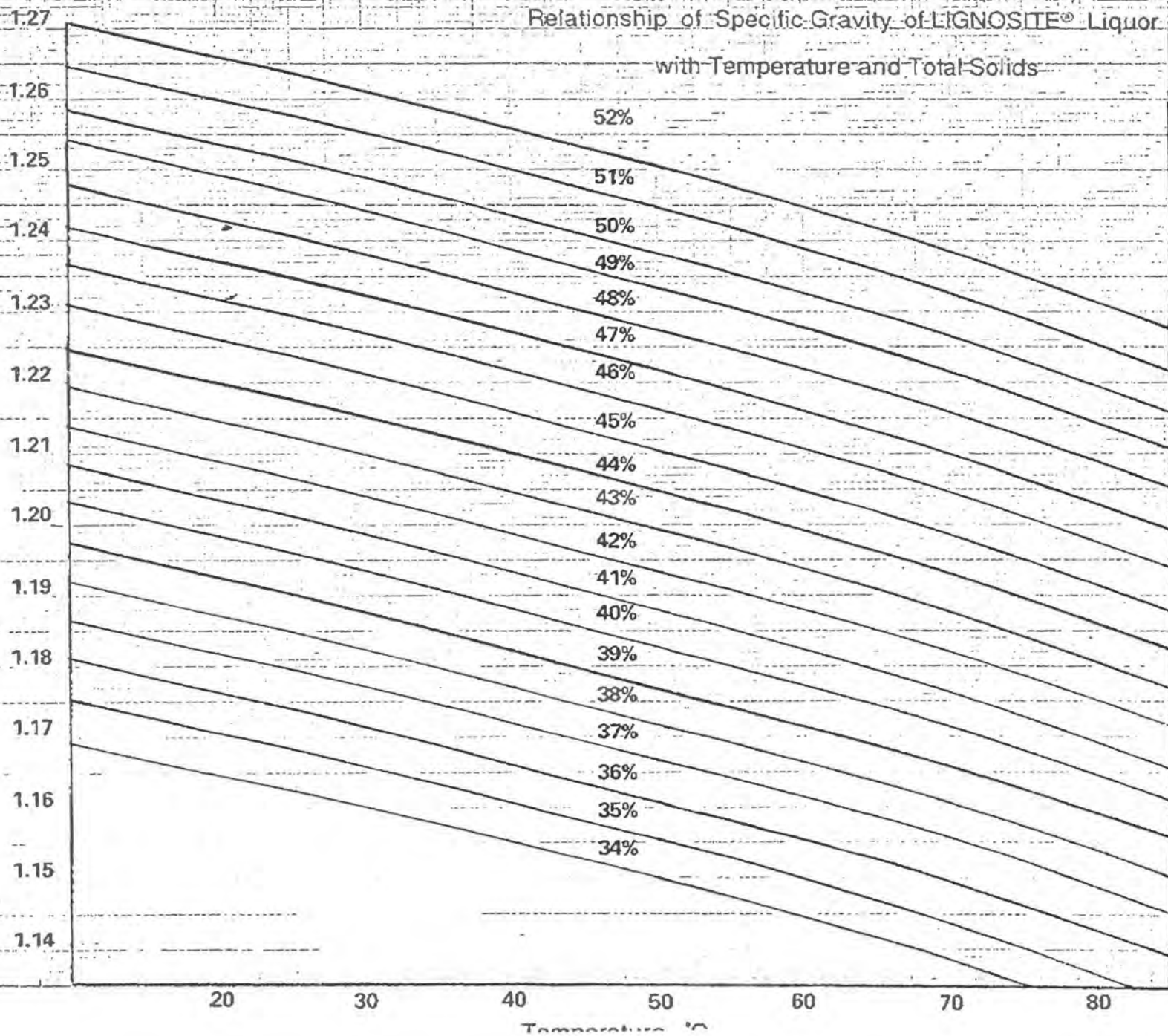


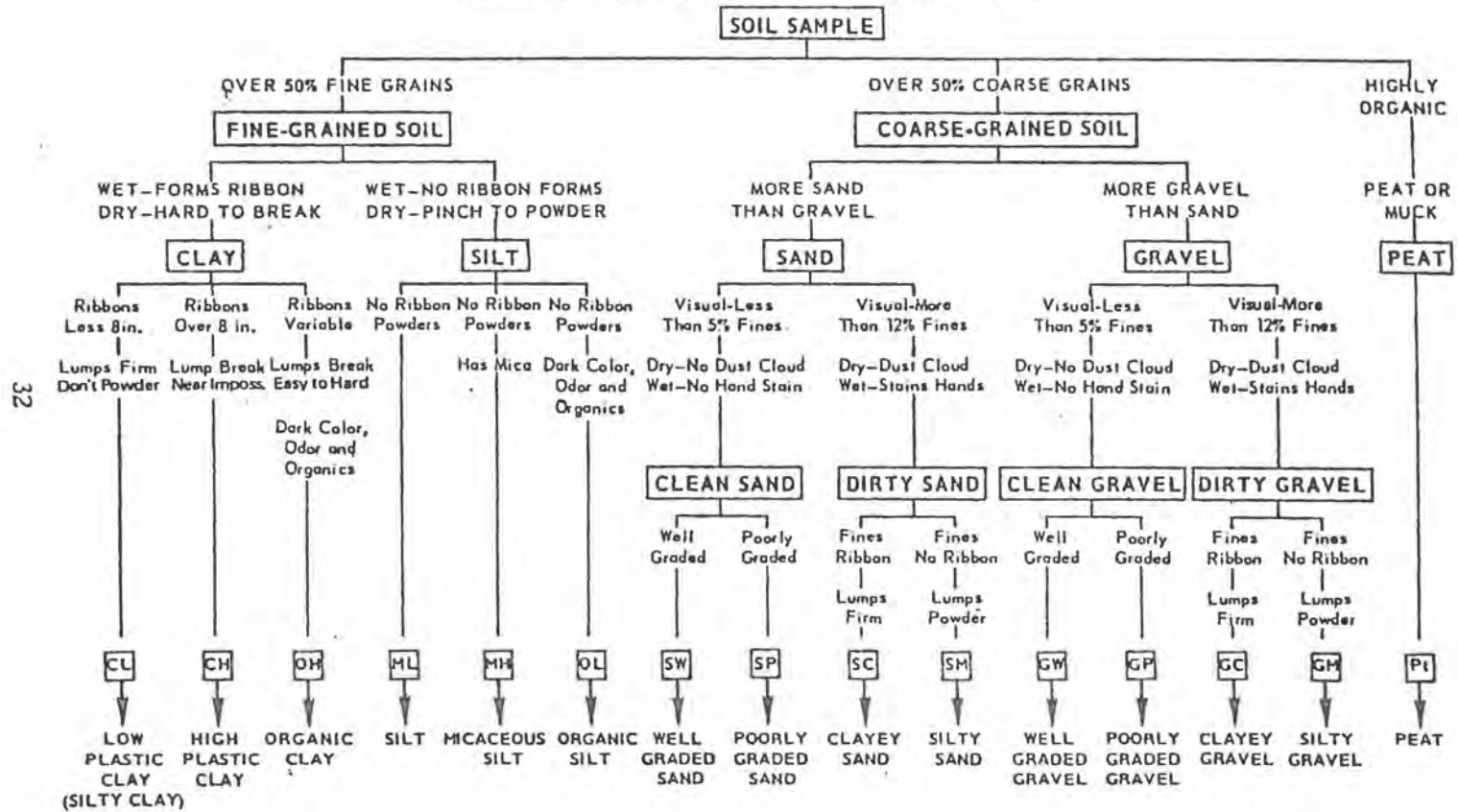
TABLE 11-4 Compaction Characteristics and Ratings of Unified Soil Classification Classes for Soil Construction [4, 6]

<i>Class</i>	<i>Compaction Characteristics</i>	<i>Maximum Dry Unit Weight Standard AASHTO (lb/ft³)</i>	<i>Compressibility and Expansion</i>	<i>Value as Embankment Material</i>	<i>Value as Subgrade Material</i>	<i>Value as Base Course</i>
GW	Good: tractor, rubber-tired, steel wheel, or vibratory roller	125–135	Almost none	Very stable	Excellent	Good
GP	Good: tractor, rubber-tired, steel wheel, or vibratory roller	115–125	Almost none	Reasonably stable	Excellent to good	Poor to fair
GM	Good: rubber-tired or light sheepsfoot roller	120–135	Slight	Reasonably stable	Excellent to good	Fair to poor
GC	Good to fair: rubber-tired or sheepsfoot roller	115–130	Slight	Reasonably stable	Good	Good to fair
SW	Good: tractor, rubber-tired, or vibratory roller	110–130	Almost none	Very stable	Good	Fair to poor
SP	Good: tractor, rubber-tired, or vibratory roller	100–120	Almost none	Reasonably stable when dense	Good to fair	Poor
SM	Good: rubber-tired or sheepsfoot roller	110–125	Slight	Reasonably stable when dense	Good to fair	Poor
SC	Good to fair: rubber-tired or sheepsfoot roller	105–125	Slight to medium	Reasonably stable	Good to fair	Fair to poor
ML	Good to poor: rubber-tired or sheepsfoot roller	95–120	Slight to medium	Poor stability, high density required	Fair to poor	Not suitable
CL	Good to fair: sheepsfoot or rubber-tired roller	95–120	Medium	Good stability	Fair to poor	Not suitable
OL	Fair to poor: sheepsfoot or rubber-tired roller	80–100	Medium to high	Unstable, should not be used	Poor	Not suitable
MH	Fair to poor: sheepsfoot or rubber-tired roller	70–95	High	Poor stability, should not be used	Poor	Not suitable
CH	Fair to poor: sheepsfoot roller	80–105	Very high	Fair stability, may soften on expansion	Poor to very poor	Not suitable
OH	Fair to poor: sheepsfoot roller	65–100	High	Unstable, should not be used	Very poor	Not suitable
PT	Not suitable	—	Very high	Should not be used	Not suitable	Not suitable

Figure 24-1 Engineering use chart based on the Unified Soil Classification.

TYPICAL NAMES OF SOIL GROUPS	GROUP SYMBOLS	IMPORTANT PROPERTIES			
		PERMEABILITY WHEN COMPACTED	SHEARING STRENGTH WHEN COMPACTED AND SATURATED	COMPRESSIBILITY WHEN COMPACTED AND SATURATED	WORKABILITY AS A CONSTRUCTION MATERIAL
WELL-GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	GW	PERVIOUS	EXCELLENT	NEGLIGIBLE	EXCELLENT
POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	GP	VERY PERVIOUS	GOOD	NEGLIGIBLE	GOOD
SILTY GRAVELS, POORLY GRADED GRAVEL-SAND- SILT MIXTURES	GM	SEMI PERVIOUS TO IMPERVIOUS	GOOD	NEGLIGIBLE	GOOD
CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND- CLAY MIXTURES	GC	IMPERVIOUS	GOOD TO FAIR	VERY LOW	GOOD
WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	SW	PERVIOUS	EXCELLENT	NEGLIGIBLE	EXCELLENT
POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	SP	PERVIOUS	GOOD	VERY LOW	FAIR
SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES	SM	SEMI PERVIOUS TO IMPERVIOUS	GOOD	LOW	FAIR
CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES	SC	IMPERVIOUS	GOOD TO FAIR	LOW	GOOD
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS WITH SLIGHT PLASTICITY	ML	SEMI PERVIOUS TO IMPERVIOUS	FAIR	MEDIUM	FAIR
INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	CL	IMPERVIOUS	FAIR	MEDIUM	GOOD TO FAIR
ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	OL	SEMI PERVIOUS TO IMPERVIOUS	POOR	MEDIUM	FAIR
INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	MH	SEMI PERVIOUS TO IMPERVIOUS	FAIR TO GOOD	HIGH	POOR
INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	CH	IMPERVIOUS	POOR	HIGH	POOR
ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY	OH	IMPERVIOUS	POOR	HIGH	POOR
PEAT AND OTHER HIGHLY ORGANIC SOILS	PT	—————	—————	—————	—————

CHART II - SOIL IDENTIFICATION PROCEDURE





...solutions for stabilizing your environment

Answers to Questions About Lignosulfonates

- Q. What are lignosulfonates and where do they come from?
- A. Lignosulfonates are complex polymers derived from trees. The wood from trees is composed mainly of three macromolecular components - cellulose, hemicellulose and lignin. In the sulfite pulping process, the lignins are sulfonated so they become water soluble and thus can be separated from the insoluble cellulose. The soluble lignins are called lignosulfonates.
- Q. What are lignosulfonates used for?
- A. Lignosulfonates are extremely versatile and are used in a wide variety of industrial applications. While generally associated with dust control and surface stabilization for roads, they are used as binders, dispersants, emulsifiers and sequestrants in a host of products such as gypsum board, animal feed pellets and micronutrient systems.
- Q. Are lignosulfonates "environmentally friendly?"
- A. Extensive studies have been conducted to evaluate the effects of lignosulfonates on the environment. Results show that they are not harmful to plants, animals or aquatic life when properly manufactured and applied. Lignosulfonates have been used as a treatment for dirt roads in Europe and the U.S. since the 1920s.
- Q. Do lignosulfonates contain heavy metals?
- A. Lignosulfonates are derived from wood and thus contain the metals that are naturally present in trees. The amounts of such metals vary depending upon the types of trees and the soil on which they were grown. The industry has voluntary standards for the levels of heavy metals in lignosulfonates.

The amount of metals typically found in lignosulfonates are well below one part per million (ppm). The industry has voluntary standards for the levels of heavy metals in lignosulfonates.

Q. Do lignosulfonates contain dioxins?

A. Dioxins are occasionally associated with the pulp bleaching process used in the wood pulp industry. However, since lignosulfonates are **removed from the pulp prior to bleaching**, dioxins are not present in the product.

It's important to note that, just as other substances, lignins can contain trace amounts of dioxins if they come into contact with dioxin-containing materials. The U.S. Environmental Protection Agency (EPA) reported in 1994 that the major source of dioxin is airborne contamination from incineration. Consequently, dioxins are practically ubiquitous.

Q. Are lignosulfonates toxic?

A. Lignins are no more toxic than table sugar. In other words, they are relatively harmless. Animal toxicity studies reveal that baking soda, table salt and Vitamin C all are significantly more toxic than lignins.

Perhaps the best testimony to the safety of lignosulfonates is the fact that the U.S. Food and Drug Administration has issued nine approvals for their use in food contact applications. They also are approved for use as a pelletizing and binding aid in animal feeds.

Q. Can lignosulfonates trigger asthma attacks?

A. No; in fact, they can help to control particulate matter that might otherwise induce asthmatic symptoms.

Lignosulfonate solutions coat individual road particles with a thin adhesive-like film that binds the particles together thereby controlling dust that might otherwise adversely affect asthmatics.

Q. Can lignosulfonates decompose into sulfur?

A. The sulfur bound in lignosulfonates is oxidized to sulfate -- not sulfur -- after application. There are no studies in the scientific literature citing sulfate as a causative factor in asthmatic reactions.

LIGNINS - A SAFE HISTORY OF USAGE

Lignosulfonates have been safely used for dust abatement and road stabilization for more than 50 years. In the late 1980's, the British Columbia Ministry of Highways and Public Works and the Ontario Ministry of Transportation and Communications performed studies on the toxicity of lignins used as dust suppressants. As a result, in June 1990, the Quebec Ministry determined that lignosulphonates posed no threat to public health or the environment and declared them safe for dust abatement.

The British Columbia Ministry affirmed that lignosulphonates are non-toxic when properly applied and expressed a preference for lignins over other types of dust suppressants used in environmentally sensitive areas.

Perhaps the most significant recognition of the safety of lignins is the nine approvals granted for their use in food contact applications by the U.S. Food and Drug Administration (FDA). Lignins also are approved by the FDA for use as an additive in animal feeds. In addition, the U.S. Environmental Protection Agency permits lignins to be used as inert ingredients in pesticide formulations applied to animals.

Animal toxicity studies reveal that baking soda, table salt, and Vitamin C all are significantly more toxic than lignins. In fact, lignins are about as acutely toxic as table sugar.

In a 1984 test described in the OECD Guideline NO. 405, 1981, "Acute Eye Irritation/Corrosion," lignin "revealed no eye irritant effect." The experiment was conducted by Scantox Biology Laboratory, which is certified by the National Testing Board of Denmark.

A 1989 study on lignin conducted by SRI International reported "no evidence of erythema or edema was reported on the skin of any of the rabbits at any time during the observation period..." The study concluded that the test substance "is considered to be nonirritating to the skin of male and female New Zealand White rabbits."

Briefly stated, the scientific literature and cumulative experience of lignins usage confirm that they are not toxic, irritating, or mutagenic, nor are they genotoxic or phytotoxic.

For Immediate Release: January 20, 1995

Contact: Larry Davenport
404-252-3663 (Office)
404-901-9150 (Home)

In response to preliminary reports that a dioxin-like substance was contained in dust abatement materials applied in Yavapai County (Arizona), The Lignin Institute issued the following statement.

REPORT ON DIOXIN-LIKE SUBSTANCE INCORRECT

(Atlanta--Jan. 20, 1995) The laboratory that analyzed a sample of calcium lignosulfonate for Yavapai County yesterday advised county road officials that the dioxin-like substance identified in their analysis could not have been naturally occurring in the lignosulfonates. The original laboratory report from Triangle Laboratories of Research Triangle Park, North Carolina apparently was misinterpreted by an outside consultant to the county, according to the Lignin Institute.

Institute Executive Director Larry Davenport said that the laboratory's results support analyses conducted on lignins by the industry. "Lignins are removed from pulpwood prior to the bleaching process generally associated with the creation of some dioxin-like compounds. They simply do not occur naturally in lignins."

As to their potential toxicity, lignins are no more toxic than table sugar. "Animal toxicity studies show that baking soda and table salt are more potentially toxic than lignins," Davenport said.

The Lignin Institute is a trade association of producers and distributors of lignin products.

TRIANGLE LABS

January 19, 1995

Mr. Richard Straub
Yavapai County Engineers
500 South Marina Street
Prescott, AZ 86301

Dear Mr. Straub:

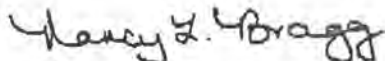
This letter address the dioxin and furan results reported for sample P4080427 which was analyzed under Triangle Laboratories' project number 29288. The sample was submitted to us by Del Mar Analytical. The chemical sample was extracted and analyzed according to the guidelines of EPA Method 8290.

The only analyte detected in the sample was 1,2,3,4,6,7,8,9-OCDD. This analyte was reported to be present with a concentration of 3.2 ppt (parts per trillion which is equivalent to picograms per gram). The result was flagged 'B', however, to indicate that 1,2,3,4,6,7,8,9-OCDD was also detected in the method blank (identified as the TLI CHEMICAL BLANK).

The level of 1,2,3,4,6,7,8,9-OCDD in the blank was 5.3 ppt. As the level of the analyte detected in the sample was approximately the same as the level detected in the blank, this analyte should *not* be considered native to sample P4080427, but rather present in the sample as a result of laboratory contamination. This interpretation is discussed on page four of the case narrative accompanying the final report that was submitted to Del Mar Analytical on September 8, 1994 and in section 5.1.3.2 of the Data User's Manual "EPA Method 8290" (rev. 12/92-LLW-7-AH-2/93).

If I can provide further information regarding this situation, please feel free to contact me at (919) 942-0241.

Sincerely,



Nancy L. Bragg
Senior Project Manager

**Arizona
Department of
Health Services**

Disease Prevention Services

1400 West Washington Street
Phoenix, Arizona 85007
(602) 542-7300
(602) 542-1753 FAX

PIPE SYMINGTON, GOVERNOR
JACK DILLENBERG, D.D.S., M.P.H., DIRECTOR

January 23, 1995

Ms. Marcia Moran Jacobson, Director
Yavapai County Health Department
930 Division Street
Prescott, Arizona 86301-3868

**RE: FOLLOW-UP LETTER REGARDING THE PRESENCE OF OCDD IN
LIGNOSITE**

Dear Ms. Jacobson:

This is a follow-up letter regarding the presence of 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (OCDD) in Lignosite. As you know, laboratory analysis of a Lignosite sample conducted by Triangle Laboratories on 9/8/94 indicated that your sample of Lignosite contained 3.2 parts per trillion (ppt) of OCDD. However, it has recently come to my attention that quality control (QC) procedures indicated that OCDD was also detected in the method blank, indicating that it was not truly present in the sample.

Mr. Greg Frey, of Dustpro Inc., provided me with portions of the narrative of the 71 page, September 8, 1994 report by Triangle Laboratories, entitled "Analysis of Samples for the Presence of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry". The discussion of QC results in the report concludes that the OCDD detected in the sample was introduced as a result of laboratory contamination.

Since the laboratory analysis indicates that the sample of Lignosite did not contain OCDD, please disregard the portion of my letter of January 3, 1995 that states that OCDD was present in the sample.

If you would like to discuss this matter in more detail, please call me at (602) 542-7312.

Sincerely,



Will Humble, M.P.H.
Epidemiology Program Supervisor,
Risk Assessment and Environmental
Epidemiology Section

/wh

cc: Greg Frey, Dustpro Inc.



BORREGAARD LIGNOTECH

MEMBER OF THE BORREGAARD GROUP

LignoTech USA
721 Route 202/206
Bridgewater, NJ 08807
(908) 429-6660
FAX: (908) 429-1112

Norlig A

Composition:

Calcium Lignosulfonate

Typical Applications:

Granulation - Limestone, coal, iron-ore.
Bulk Coating - Roads, phosphate, coal stock piles.
Compaction - Coal, metal wastes.
Dispersion- Gypsum stucco, clay slurries.

Function:

Binding/Dispersion

TYPICAL ANALYSIS

Chemical Data:

4.0 pH
0.1% Sodium
4.0% Calcium
5.1% Sulphonate Sulfur
6.1% Total Sulfur
16.0% Reducing Sugars

Physical Data:

Color: Brown

Powder: 5.0% Moisture
36 lbs/ft³ Bulk Density

Liquid: 50/58% Solids
5.2/6.2 lbs. solids/gallon
70/450 cps Viscosity @ 25°C

WEIGHT

10.8 - 10.9 LBS PER GALLON
185 GALLONS PER TON

GENERAL SPECIFICATIONS

	<u>Minimum</u>	<u>Maximum</u>
Powder: pH: 3% Solution	3.0	4.5
% Moisture	3.0	8.0
Liquid: pH (as is)	3.0	4.5
50% Solids	48.0	52.0
58% Solids	56.0	60.0

This is not a formal specification.

Only active customers will be notified of specification changes.

Storage Stability: Under dry conditions, powder products remain stable for several years.

Shelf life for liquid products may vary from a few months to several years dependent upon the specific product and storage environment.

Compatibility: Lignosulfonates are compatible with anionic and non-ionic, dispersants, wetting agents and most organic and inorganic materials.

Quality Control Methods are available upon request

Packaging: Powder is packaged in 50 lb. net weight multiwall kraft bags or non-returnable bulk bags. Liquid product comes in 55 U.S. gallon drums, 4,000 gallon tanktrucks or 20,000 gallon tankcars.

Lead Times: Powder products require 2 weeks lead time while for liquid 1 weeks typical.

Material Safety Data Sheets are available upon request.

Please contact your LignoTech Sales representative for additional product information.



LIGNOSITE® Calcium Lignosulfonate

PRODUCT INFORMATION SHEET

Regulatory Information and Toxicity Data

U. S. FOOD AND DRUG ADMINISTRATION

Subject to the provisions of each section in the Code of Federal Regulations, LIGNOSITE Calcium Lignosulfonate is approved for the following uses (please consult CFR Section for full text and limitations that may apply):

- 21 CFR 172.715: Approved for use in or on food as dispersing agent and stabilizer in pesticides for certain food crops.
- 21 CFR 175.105: Approved for use in adhesives used on contact with foods.
- 21 CFR 176.170: Approved for use as components of coatings for paper and paperboard used in packaging, processing, transporting, et cetera, of food.
- 21 CFR 176.210: Approved for use as defoaming agents in the manufacture of food packaging materials.
- 21 CFR 573.600: Approved for use in animal feed up to 4%.

Letter of Approval: Considered generally recognized as safe for use in flotation tanks for washing whole pears provided that the pears are subjected to a potable water rinse after leaving the flotation tank.

ORGANIC FOOD PROCESSING

The Washington State Department of Agriculture "Materials and Standards for Organic Production" 1990 generic list grants lignosulfonates an approved status for use in organic post-harvest pear processing.

U. S. COAST GUARD AND MARITIME

- 46 CFR 150: Notice of compatibility with all cargo except sulfuric acid and isocyanates.
- 46 CFR 153: May be carried in tank vessels having neither a Certificate of Inspection under Subchapter D (tank vessels) nor a Letter of Compliance under Part 153.

*LIGNOSITE is a registered trademark of Georgia-Pacific Corporation. All LIGNOSITE lignosulfonate products are derived from a uniform mix of softwood to insure maximum purity and optimum dispersive characteristics.

IMPORTANT: The technical data herein is believed to be accurate. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein shall be construed as a license to operate under, or recommendation to infringe, any patents.

TOXICITY

LD₅₀ = 28.5 gms solids/kg in rats - "not toxic" by FHSA definition.

Not a skin or eye irritant by FHSA definition.

Not listed as a carcinogen by IARC, NTP, OSHA or ACGIH.

Exposure of six rats to 198 mg/m³ of LIGNOSITE Calcium Lignosulfonate dust for four hours resulted in neither mortality nor observed signs of toxicity.

96-hour LC₅₀ Static Bioassay of LIGNOSITE Calcium Lignosulfonate liquid at 50% solids gave a lethal concentration (LC₅₀) of 4250 mg/l for juvenile rainbow trout.

OTHER

ACGIH: No threshold limit value (TLV) established by American Conference of Governmental Industrial Hygienists.

OSHA: No permissible exposure level (PEL) established by OSHA.

TSCA: Registered under Toxic Substances Control Act, initial inventory, CAS #68131-32-8.

USDA: USDA self-certification (9 CFR 317.20); is FDA-approved.

DOT: Non-regulated.

LIGNOSITE Calcium Lignosulfonate has been approved by the U. S. Forest Service for use on roads for dust abatement.

IMPORTANT: The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations. GEORGIA-PACIFIC MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND DATA HEREIN. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY EXCLUDED. Georgia-Pacific will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading.



PRODUCT INFORMATION SHEET

CAS REGISTRY NUMBER 68131-32-8
(FERMENTED SPENT SULFITE LIQUOR)

DUSTAC® Road Binder

DUSTAC® Road Binder is an aqueous form of calcium lignosulfonate. This product is partially neutralized to raise the pH and minimize the corrosivity. The fifty-percent aqueous solution is in a convenient form for transport and stor-

age of large quantities of lignosulfonate. It disperses readily in cold or hot water to yield a stable, brown-colored solution. Viscosity and specific gravity data are available on request.

TYPICAL ANALYSIS

(Based on Oven-Dry Solids)

Total solids, %	48-52
Calcium lignin sulfonate, %	77-83
Insolubles ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), %	< 2.5
pH of 10% solution	5.0-7.0

TYPICAL PHYSICAL PROPERTIES

Specific gravity (liquid), 25°/15°C	1.25
Gallon weight, lbs	10.4
Gallons / ton	191
Brookfield viscosity, cp at 25°	700

More detailed analyses may be obtained upon request.

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SHIPPING

Georgia-Pacific manufactures DUSTAC® lignosulfonate products at its pulp and chemical complex in Bellingham, Washington, where deep-water port facilities are available for ocean-going vessels.

DUSTAC® Road Binder is available as a 50% solution in tank cars or tank trucks from the Bellingham plant or from distribution points located throughout the United States.

Shipments of lignosulfonates are not regulated by the Department of Transportation (DOT). The proper shipping name for this product is *lignin liquor* for the liquid form.

The designation for shipments of lignin liquor is NMFC Item 111270 for tank truck and UFC Item 56790 or STCC Item 2611215 for rail.

In case of emergency contact the Bellingham plant at (206) 733-4410.

STORAGE & HANDLING

Solutions of DUSTAC® Road Binder can be stored in mild-steel tanks. It is recommended that storage tanks have some means of agitation. Lignosulfo-

nate solutions should be maintained at temperatures sufficient to provide suitable viscosities. Viscosity and corrosion data on this product are available on request.

Centrifugal pumps should be used to transfer DUSTAC® Road Binder solutions that are maintained at temperatures to provide a flowable product. Positive displacement pumps with low rpm are recommended to meter the product. All pumps should have mechanical seals or lubricated (non-grease) packing.

Lignosulfonate solutions are biodegradable. Contamination by naturally occurring airborne organisms can occur and cause pressure to develop if the fermenting material is placed in a sealed container.

As with all organic material, caution is advised when storing or handling this product near strong oxidizing agents. Prolonged and excessive heating of DUSTAC® Road Binder solutions can result in decomposition and the release of toxic sulfur dioxide fumes.

The use of appropriate protective clothing, e.g., goggles, rubber gloves, and/or suitable

respirator, is recommended when handling DUSTAC® products. In case of skin contact, wash the affected area thoroughly with water. Accidental spills should be hosed down and diluted with water. Disposal should be in accordance with standard industrial waste disposal methods.

More information on the proper handling of DUSTAC® Road Binder is in the material safety data sheet available from Georgia-Pacific.

SALES & SERVICE

Georgia-Pacific produces a wide variety of lignosulfonate products. These products are manufactured under rigid controls to insure a finished product of the highest quality.

A nationwide team of sales representatives is available for assistance. They are supported by a staff of highly qualified research chemists and technical specialists who are skilled in the handling and application of lignosulfonates.

For more information, please contact one of the chemical sales offices listed below.

SALES OFFICES

Bellingham, WA 98225
P.O. Box 1236 (98227)
300 W. Laurel Street
Telephone: 206-733-4410
1-800-365-4348
Fax: 206-676-7217, -7206

Tacoma, WA 98421
1754 Thorne Road
Telephone: 206-572-8181
1-800-955-5498
Fax: 206-572-4721

Monrovia, CA 91016
1426 Encino Avenue
Telephone: 818-445-8007
Fax: 818-445-4921

Houston, TX 77032
Suite 125
149590 Heathrow Forest Pk.
Telephone: 713-442-1069
1-800-876-7863
Fax: 713-442-1081

PRODUCT INFORMATION SHEET

CAS REGISTRY NUMBER 68131-32-8
(FERMENTED SPENT SULFITE LIQUOR)

DUSTAC® Road Binder

Water Toxicology Information

The term 96-h LC₅₀ is defined as the concentration of a substance that will kill 50% of the exposed organisms in water within 96 hours. Synonymous terms are TLM₉₆ and 96-h TL₅₀ (median tolerance limit). The bioassay may be conducted under static or continuous flow conditions. Because of the lack of test standardization and the wide variety of species involved, ranges of toxicity, rather than a single toxic dose, are sometimes used to give an indication of the toxicity of substances to aquatic life. For this reason, care must be given to comparing bioassay data.

It should be noted that although acute toxicity data are more complete and therefore present the best method of ranking substances according to hazard, chronic or sub-lethal effects may have important ecological considerations. In addition, the biochemical oxygen demand of a substance should be considered along with water toxicological data in determining overall environmental effects. For many chemicals, no published aquatic toxicity data are available. In these cases, the ratings are estimated from physical properties and extrapolations of data from chemically similar compounds and are given in parentheses.

Hann and Jensen¹ have assigned aquatic toxicology ratings as follows: Grade 0 (>1000 mg/l), insignificant hazard; Grade 1 (100-1000 mg/l), practically non-toxic; Grade 2 (10-100 mg/l), slightly toxic; Grade 3 (1-10 mg/l), moderately toxic; Grade 4 (<1 mg/l), highly toxic. Several substances, their 96-h LC₅₀ (juvenile rainbow trout) and reference sources are listed below.

<u>Chemical Substance</u>	<u>96-h LC₅₀</u>	<u>Grade</u>
DUSTAC® Road Binder ⁴	1,400 ppm	0
Calcium Chloride ³	over 1,000 ppm	0
Alcohol (Ethyl) ¹	N/A	0
Sugar, Raw (Cane Sugar) ¹	N/A	0
Borax (Tetrasodium Borate, Decahydrate) ¹	N/A	(1)
Gasoline (Commercial) ¹	N/A	2
Bleaching Powder (Calcium Hypochlorite) ¹	N/A	(3)
Sodium Pentachlorophenate) ²	0.0686 ppm	4

¹Roy W. Hann and Paul A. Jensen. Water Quality Characteristics of Hazardous Materials. Texas A and M University, College Station, Environmental Engineering Div., 1977.

²Static Bioassay (juvenile rainbow trout), B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada. 1981.

³N. Irving Sax, Editor. Dangerous Properties of Industrial Materials. New York: Van Nostrand Reinhold Company, Inc., 1984.

⁴Laucks Testing Laboratories, Inc. Aquatic Toxicity Evaluation Summary: Rainbow Trout. Seattle, Washington: 1994

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PRODUCT INFORMATION SHEET

CAS REGISTRY NUMBER 68131-32-8
(FERMENTED SPENT SULFITE LIQUOR)

DUSTAC® Road Binder

Biochemical Oxygen Demand (BOD)

The capacity of organic material to consume dissolved oxygen (DO) as it decomposes is one of the most important effects of water pollution, as oxygen is necessary for the maintenance of fish, mollusks, and other aquatic life. The BOD test is used to measure the rate at which decomposable organic material will consume oxygen in water. The test was designed as a laboratory model of the deoxygenating effect of wastes on receiving waters and is essentially a bioassay involving the measurement, under standard conditions, of oxygen consumed by living microorganisms as they utilize the organic material for food.

The standard five-day BOD test consists of enclosing a sample of water plus the test sample in an air tight bottle, incubating it at 20°C in the dark for five days, and measuring the amount of DO present before and after incubation. The difference in DO is the BOD₅ and is often expressed as parts per million (ppm) or milligrams per day (mg/d) when measuring the BOD load of an effluent stream. When measuring the BOD of a chemical substance, it is more commonly measured in percent. By definition, sucrose (sugar) has a BOD₅ of 100%. These terms always refer to a quantity of oxygen and not to organic matter as such. The higher the BOD₅, the greater the amount of deoxygenating effect the substance has in receiving waters. It should be noted that in case of accidental spills into waterways, most substances undergo a tremendous dilution effect; therefore, their BOD₅ would be reduced accordingly.

The BOD₅ test is complex by nature and is subject to interpretation, therefore care must be exercised when comparing the BOD₅ of various substances. Several substances and their typical BOD₅ as determined in our laboratory are listed below.

DUSTAC* Road Binder	10%
Tomato Soup	14%
Animal Glue	30%
Sugar (Sucrose)	100%
Alcohol (Ethyl Alcohol)	130%

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PRODUCT INFORMATION SHEET

CAS REGISTRY NUMBER 68131-32-8
(FERMENTED SPENT SULFITE LIQUOR)DUSTAC[®] Road BinderLD₅₀ Toxicity Data

Lethal dose 50% (LD₅₀) refers to the amount of a substance expected to kill 50% of the test animals used in a controlled study. An unacceptable LD₅₀ would be a number less than the 5,000 mg/kg toxicity definition determined by the U.S. Food and Drug Administration. For example, the LD₅₀ for oral administration for strychnine to rats is 16 milligrams per one kilogram of body weight. The LD₅₀ for sucrose (table sugar) orally administered to rats is 29,700 milligrams per kilogram of body weight. In this instance, if 10 rats weighing two kilograms each were given 59,400 milligrams of sugar (about 3% of their body weight), five of those rats would be expected to die. Several substances, their LD₅₀s (oral-rat), and reference sources are listed below.

Sodium Cyanide ¹	6.4 mg/kg
Strychnine ¹	16 mg/kg
Caffeine (1,3,7 Trimethylxanthine) ¹	192 mg/kg
Aspirin (Acetylsalicylic acid) ¹	1,000 mg/kg
Calcium Chloride ¹	1,000 mg/kg
Detergent (Sodium Dodecylbenzene Sulfonate) ¹	1,260 mg/kg
Table Salt (Sodium Chloride) ¹	3,000 mg/kg
Baking Soda (Sodium Bicarbonate) ¹	4,220 mg/kg
Alcohol (Ethyl Alcohol) ¹	7,060 mg/kg
Magnesium Chloride Hexahydrate ¹	8,100 mg/kg
Vitamin C (Ascorbic Acid) ²	11,900 mg/kg
DUSTAC [®] Road Binder ³	>15,000 mg/kg
Sugar (Sucrose) ¹	29,700 mg/kg

¹N. Irving Sax, Editor. Dangerous Properties of Industrial Materials. New York: Van Nostrand Reinhold Company, Inc., 1984.²U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances, Volume 1. April 1987.³Laucks Testing Laboratories, Inc. Aquatic Toxicity Evaluation Summary: Rainbow Trout. Seattle, Washington: 1994.

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scopic and microscopic fragments of decayed vegetable matter.

Permeability That property in a soil which permits water to flow through it.

Plastic A soil is said to be plastic if, within some range of water content, it can be rolled out into thin threads.

Plastic Limit (PL) The lowest moisture content, in terms of dry weight, at which the soil can be rolled into a thread $\frac{1}{8}$ inch in diameter without the thread breaking into pieces.

Plasticity Index (PI) The numerical difference between the liquid and plastic limits of a soil. PI indicates the range of moisture content over which the soil is in a plastic condition.

Proctor Tests More commonly known as the AASHTO tests.

Profile A charted line indicating grades and distances, and usually depth of cut and height of fill for excavation and grading work, commonly taken along the centerline.

Pumice A variety of volcanic glass full of minute cavities and very light in weight.

Quicksand A term commonly applied to fine or very fine sand that has passed into a semi-liquid state under the influence of a rising current of seeping water.

RC, Cutback Asphalt Asphalt fluxed with gasoline or naphtha to provide a rapid-curing mixture.

RT Tar used for road-mix or plant-mix material.

Sand A cohesiveless aggregate of round, sub-angular and angular fragments of rock with particle size between 2.0 and 0.005 mm.

SC, Liquid Asphalt Asphalt fluxed with a non-volatile oil which provides a slow-curing mixture that will remain liquid for considerable time.

Seal Coat A very thin single surface treatment

of bituminous material covered with a fine aggregate or sand. Applied to prevent the entrance of moisture and air into the course on which it is placed.

Seam A layer of rock, coal, or ore.

Sedimentary Rock Fragments and particles of igneous rock that has been broken down, transported and rehardened by natural forces.

Shrinkage A reduction in soil volume when the moisture content is reduced.

Sieve Analysis A mechanical separation process for determining the fractional amounts of various grain size material contained in a soil sample.

Silt A soil composed of particles between 0.005 mm and 0.05 mm in diameter. A heavy soil intermediate between clay and sand.

Slag Refuse from steel-making.

Spall To break off from a surface in sheets or pieces.

Specific Gravity A number representing the number of times a specific volume of a substance is heavier than an equal volume of water.

Tack Coat An application of bituminous material to the surface of a base course or existing pavement preparatory to placing a bituminous mat upon it. The purpose is to insure a thorough bond between courses.

Talus Loose rock or gravel formed by disintegration of a steep rock slope.

Till An unstratified gravel deposit of clay, silt, sand, gravel and boulders.

Transported Soil A soil consisting chiefly of the results of chemicals and physical rock weathering located at a place other than the point of origin.

Tuff A fine-grained, water-or-wind-laid aggregate of very small mineral or rock fragments ejected from volcanoes during explosions.

Windrow A ridge of loose soil or rock.